AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(NASA-SP-7037(284)) AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 284) (NASA) 261 p N93-14605

Unclas

00/01 0135356



AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES



National Aeronautics and Space Administration Scientific and Technical Information Program Washington, DC 1992

INTRODUCTION

This issue of *Aeronautical Engineering—A Continuing Bibliography* (NASA SP-7037) lists 974 reports, journal articles, and other documents originally announced in October 1992 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*.

Accession numbers cited in this issue are:

STAR (N-10000 Series) N92-28223 — N92-30232 IAA (A-10000 Series) A92-44895 — A92-49229

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems. It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the publication consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by the first nine *STAR* specific categories and the remaining *STAR* major categories. This arrangement offers the user the most advantageous breakdown for individual objectives. The citations include the original accession numbers from the respective announcement journals.

Seven indexes—subject, personal author, corporate source, foreign technology, contract number, report number, and accession number—are included.

A cumulative index for 1992 will be published in early 1993.

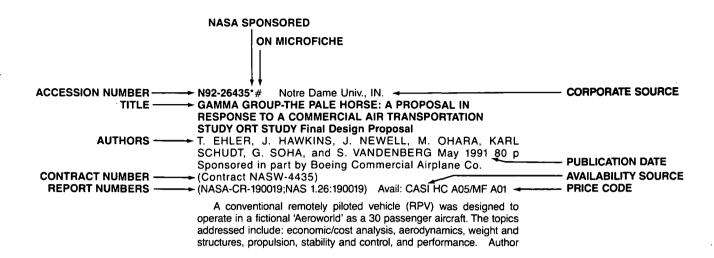
Information on availability of documents listed, addresses of organizations, and CASI price schedules are located at the back of this issue.

CONTENTS

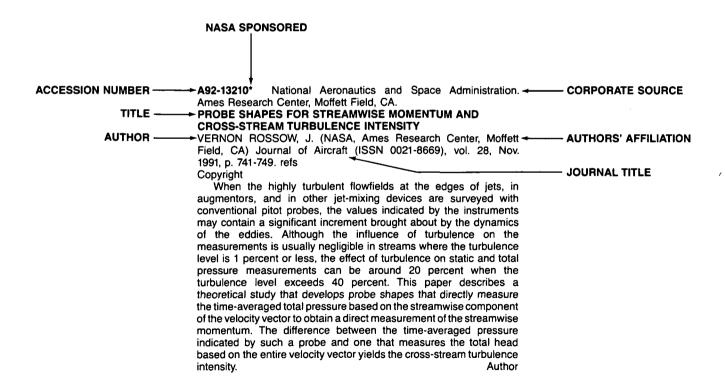
Catego	ry 01	Aeronautics (General)	783
Catego	Includes	Aerodynamics aerodynamics of bodies, combinations, wings, rotors, and control surd internal flow in ducts and turbomachinery.	787
Catego	ry 03 Includes	Air Transportation and Safety passenger and cargo air transport operations; and aircraft accidents.	833
Catego	Includes	Aircraft Communications and Navigation digital and voice communication with aircraft; air navigation systems and ground based); and air traffic control.	839
Catego		Aircraft Design, Testing and Performance aircraft simulation technology.	841
Catego	•	Aircraft Instrumentation cockpit and cabin display devices; and flight instruments.	855
		Aircraft Propulsion and Power prime propulsion systems and systems components, e.g., gas turbine and compressors; and onboard auxiliary power plants for aircraft.	860
Catego		Aircraft Stability and Control aircraft handling qualities; piloting; flight controls; and autopilots.	871
Catego	Includes	Research and Support Facilities (Air) airports, hangars and runways; aircraft repair and overhaul facilities; nels; shock tubes; and aircraft engine test stands.	879
	Includes facilities space co spacecra	Astronautics astronautics (general); astrodynamics; ground support systems and (space); launch vehicles and space vehicles; space transportation; emmunications, spacecraft communications, command and tracking; ft design, testing and performance; spacecraft instrumentation; and ft propulsion and power.	889
	Includes physical	Chemistry and Materials chemistry and materials (general); composite materials; inorganic and chemistry; metallic materials; nonmetallic materials; propellants and dimaterials processing.	891
	Includes electrical photogra	Engineering engineering (general); communications and radar; electronics and engineering; fluid mechanics and heat transfer; instrumentation and phy; lasers and masers; mechanical engineering; quality assurance polity; and structural mechanics.	896

Category 13 Geosciences Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.	915				
Category 14 Life Sciences Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and space biology.	N.A.				
Category 15 Mathematical and Computer Sciences Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.	916				
Category 16 Physics Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.	924				
Category 17 Social Sciences Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law, political science, and space policy; and urban technology and transportation.	928				
Category 18 Space Sciences Includes space sciences (general); astronomy; astrophysics; lunar and planet- ary exploration; solar physics; and space radiation.	929				
Category 19 General	929				
Subject Index					
Personal Author Index					
				Report Number Index	
				Accession Number Index	
Ammanalise	אם ב				

TYPICAL REPORT CITATION AND ABSTRACT



TYPICAL JOURNAL ARTICLE CITATION AND ABSTRACT



AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 284)

November 1992

01

AERONAUTICS (GENERAL)

A92-44895

ASSEMBLING THE FUTURE

DOUGLAS BARRIE Flight International (ISSN 0015-3710), vol. 141, no. 4322, June 10, 1992, p. 50-52.

Copyright

An overview is presented of the expansion work currently in progress to handle final assembly of A321 aircraft, which program has recently been awarded to Deutsche Airbus. Consideration is given to the primary contractors and the major subassemblies of the A321 and how the various sections will be handled to achieve final assembly.

A92-45302

INTERNATIONAL POWERED LIFT CONFERENCE, LONDON, ENGLAND, AUG, 29-31, 1990, PROCEEDINGS

Conference sponsored by Royal Aeronautical Society. London, Royal Aeronautical Society, 1990, 375 p. For individual items see A92-45303 to A92-45325.

(ISBN 0-903409-68-2) Copyright

The present volume on powered lift discusses U.S. Air Force STOVL activities, jet-powered V/STOL aircraft, the Harrier international program, and V/STOL engine design evolution. Attention is given to a remote tip-driven fan-powered supersonic fighter concept, the military utility of medium-speed V/STOL design, ASTOVL flexibility in the 21st century, and a USAF assessment of STOVL fighter options. Topics addressed include the evolution of ASTOVL aircraft design, ASTOVL propulsion systems configuration and concept choice, recent developments at the Shoeburyness STOVL test facility, and configuration effects on the ingestion of hot gas into the engine intake. Also discussed are hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept, the progress of the ASTOVL control concept studies under the VAAC program, ASTOVL engine control, small-scale experiments in STOVL ground effects, and numerical simulation of powered-lift flows.

A92-45303

AN OVERVIEW OF US NAVY AND MARINE CORPS V/STOL

LEONARD S. FREEMAN, FRANCIS J. O'BRIMSKI, and LISA J. PFANNESCHLAG (U.S. Navy, Naval Air Systems Command, IN: International Powered Lift Conference. Washington, DC) London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. I.6.1-I.6.14.

Copyright

U.S. Navy and Marine Corps activities with regard to V/STOL aircraft development for military operations are reviewed. Some historical Navy V/STOL programs are discussed, with emphasis on their importance for the progression of the present technical data base. Propulsion technology is the key factor in any V/STOL concept and in current Navy V/STOL activities. The position of the Navy and the Marine Corps in the acquisition process is examined, and the programs involved in this process are highlighted. Attention is also given to maritime unique criteria, in-house studies, flight demo definition, force structure considerations, ground environment testing, and engine programs.

A92-45309

ASTOVL FLEXIBILITY IN THE 21ST CENTURY

RICHARD A. NIKSCH (McDonnell Aircraft Co., Saint Louis, MO) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.7.1-II.7.21. Copyright

This paper addresses the probable conflict scenarios of the 21st century, how an ASTOVL aircraft could be used, and its concepts of operation. The ASTOVL aircraft would complement current conventional take-off and landing aircraft both in Third World conflicts and in the European environment. Additionally, the advantages of an ASTOVL aircraft to the user/operator are

illustrated from the perspective of 'lessons learned' from past STVL operations. The pros and cons of the advanced technology features considered in the engineering-design process are addressed.

A92-45376

INTERNATIONAL PACIFIC AIR AND SPACE TECHNOLOGY CONFERENCE AND AIRCRAFT SYMPOSIUM, 29TH, GIFU, JAPAN, OCT. 7-11, 1991, PROCEEDINGS

Warrendale, PA, Society of Automotive Engineers, Inc. (SAE P-246), 1991, 931 p. For individual items see A92-45377 to A92-45458. (SAE P-246; ISBN 1-56091-146-8) Copyright

Various papers on air and space technology are presented. Individual topics addressed include: media selection analysis: implications for training design, high-speed challenge for rotary wing aircraft, high-speed VSTOL answer to congestion, next generation in computational aerodynamics, acrobatic airship 'Acrostat', ducted fan VTOL for working platform, Arianespace launch of Lightsats, small particle acceleration by miniraligun. free-wake analyses of a hovering rotor using panel method, update of the X-29 high-angle-of-attack program, economic approach to accurate wing design, flow field around thick delta wing with rounded leading edge, aerostructural integrated design of forward-swept wing, static characteristics of a two-phase fluid drop system, simplified-model approach to group combustion of fuel spray, avionics flight systems for the 21st century. Also discussed are: Aircraft Command in Emergency Situations, spectrogram diagnosis of aircraft disasters, shock interaction induced by two hemisphere-cylinders, impact response of composite UHB propeller blades, high-altitude lighter-than-air powered platform, integrated wiring system, auxiliary power units for current and future aircraft, Space Shuttle Orbiter Auxiliary Power Unit status, numerical analysis of RCS jet in hypersonic flights, energy requirements for the space frontier, electrical system options for space exploration, aerospace plane hydrogen scramjet boosting, manual control of vehicles with time-varying dynamics, design of strongly stabilizing controller, development of the Liquid Apogee Propulsion System for ETS-VI.

A92-45407* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA. UPDATE OF THE X-29 HIGH-ANGLE-OF-ATTACK PROGRAM

GARY TRIPPENSEE (NASA, Flight Research Center, Edwards, CA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 375-382.

(SAE PAPER 912006) Copyright

The X-29A forward-swept wing flight research aircraft flight envelope was expanded to 66 deg angle-of-attack during 1990. Following this flight envelope expansion, a military utility evaluation was performed to investigate the tactical utility of the X-29 configurations at high-angle -of-attack, slow-speed flight conditions. An overall management view and perspective of the expansion process, the technical problems encountered, and the results obtained when compared to the predictions are presented.

R.E.P.

A92-45421

AVIONICS FLIGHT SYSTEMS FOR THE 21ST CENTURY

RICHARD A. PEAL (Boeing Commercial Airplane Group, Seattle, WA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 513-524. (SAE PAPER 912033) Copyright

This paper illustrates the need to establish requirements for the 21st century system immediately to support the design and development of the ground and airborne equipment that will provide an economical evolution from existing systems to the post-year 2000 system. Technology limitations are no longer principal constraints to defining the required or desired operation and maintenance of commercial transport aircraft. Rather, the limitation is the ability to develop a total system requirements definition to develop the most cost-effective architecture from today's system.

R.E.P

A92-45699

A NEW MILESTONE IN AUTOMATIC AIRCRAFT CONTROL -FLY-BY-LIGHT SYSTEMS TRANSMIT COMMANDS OPTOELECTRONICALLY

New-Tech News (ISSN 0935-2694), no. 2, 1992, p. 16-20. Copyright

A fly-by-light (FBL) aircraft control system capable of overcoming strong radio interference and relieving a pilot of a great deal of work is considered. FBL is an extremely stable and reliable system which is important for both military and civil applications of the future generation of helicopters.

O.G.

A92-46202

AVIATION, MOTOR, AND SPACE DESIGNS

ALEXANDÉR BOLONKIN IN: Emerging technology in the Soviet Union: Selected papers with analysis. Falls Church, VA, Delphic Associates, Inc., 1990, p. 32-80. Copyright

An overview is given of aviation, motor, and space design projects undertaken at the Eastern Siberian Technological Institute in the Soviet Union between 1986 and 1988. The organization of the Institute and its organization of research are briefly reviewed. The designs of supersonic VSTOL, including its passenger and transport versions, are examined. Work done on a rotary combustion engine and on other projects is examined, including a space motor using solar wind, space solar sail, simple space nuclear reactive motors and electric generators run on radioactive substances, hydrotransmission for automobiles, the transformation of light energy into mechanical energy, a ship using wave energy, new noncontact means of transportation, a compact and simple device for creating a strong open continuous electrical field, and the development of electrically neutral plasma.

A92-47403

COMPOSITES IN MANUFACTURING - CASE STUDIES

A. B. STRONG, ED. (Brigham Young University, Provo, UT) Dearborn, MI, Society of Manufacturing Engineers, 1991, 335 p. For individual items see A92-47404 to A92-47418. (ISBN 0-87263-406-X) Copyright

The papers presented in this volume focus on 19 cases of applied technology in composites design and manufacturing, all of them dealing with specific products. Topics covered include design using composite in aerospace, innovative materials and processing, tooling, fasteners and adhesives, finishing, repair, specialty applications of composites, and applications in the automotive industry. Papers are presented on the filament winding of isogrid fuselage structures; design and use of aramid fiber in aircraft structures; resin transfer molding of a complex composite aircraft structure; and field repair of an advanced helicopter vertical fin structure.

A92-47405

FILAMENT WINDING OF COMPOSITE ISOGRID FUSELAGE STRUCTURES

LARRY J. ASHTON, STEVEN D. HUNTSMAN, MICHAEL G. ALLMAN, A. B. STRONG, and CHRISTOPHER A. ROTZ (Brigham Young University, Provo, UT) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 19-32. refs Copyright

The filament winding of composite isogrid fuselage structures is investigated as a cost-effective and high-productivity method of manufacturing large aircraft structures. It is shown that the automated combination of filament winding and tow placement offers a low-cost alternative to the expensive hand-laid prepreg technology. Combination filament winding and tow placement of isogrid have been demonstrated in prototype parts. The testing of these components confirms the theoretical predictions that isogrid is a superior aircraft structure design. The inherent damage tolerance and redundancy of isogrid will allow the use of higher design strain allowables and other design parameters, yielding lighter and stronger structures.

A92-47407

DESIGN AND USE OF ARAMID FIBER IN AIRCRAFT STRUCTURES

PAUL R. LANGSTON IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 49-77.
Copyright

The use of Kevlar fibers and Nomex honeycomb in aircraft structures is discussed with particular reference to the design, fabrication, and properties of Kevlar/Nomex sandwich structures. The applications discussed include filament-wound pressure vessels and a variety of structural, interior, and systems applications. It is shown that improved composite designs can reduce weight and thus improve fuel efficiency, lower final costs, lower life cycle costs, reduce maintenance, and increase dispatch reliability.

A92-47410

RESIN TRANSFER MOLDING OF A COMPLEX COMPOSITE AIRCRAFT STRUCTURE

DALE BROSIUS and MARK WADSWORTH IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 111-127.

Copyright

The use of resin transfer molding (RTM) to manufacture the elevator trim tab for the Beech Starship aircraft is discussed. The specific of the process are described, with attention given to the choice of resin and reinforcement, preform technology, part geometry and size, fiber loading and placement, mold conditions, and injection variables. Tooling considerations are examined in detail. The results of the study demonstrate the effectiveness of the RTM process for the manufacture of composite aerospace components.

A92-47413

THE ROLE OF NONMETALLIC FASTENERS IN AIRCRAFT WINGS AND OTHER COMPOSITE STRUCTURES

IMRE BERECZ (Microdot Aerospace Fastening Systems Corp., Fullerton, CA) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 167-174.

Copyright

The development and use of fasteners designed specifically for composite structures are discussed. First, some problems associated with the use of metal fasteners for composites are reviewed, and the evolution of composite fasteners is examined. Attention is then given to the use of composite fasteners for the Boeing A-6 wing, fabrication and design concepts for composite fasteners, and some new fastener concepts for the B-1B bomber's tail section.

A92-47414 USE OF ADHESIVE BONDED ATTACHMENTS FOR A COMPOSITE AIRCRAFT FUEL TANK

ALEXANDER B. CARTER, III (Click-Bond, Inc., Carson City, NV) and MICHAEL W. CASE (Brunswick Corp., Skokie, IL) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 175-188. refs Copyright

The use of adhesively bonded attachments as a way of avoiding problems associated with the use of traditional fasteners, such as bolt and rivets, in composite structures is discussed with particular reference to the fabrication of composite aircraft fuel tanks. Several types of adhesive bonded fasteners and their advantages are described, and the importance of proper surface preparation is emphasized. The discussion also covers general installation procedures for adhesive bonded structures and a comparison between riveted and bonded nutplate installations.

A92-47416 ADVANCED COMPOSITE COMPONENTS IN AIRLINE SERVICE STATUS AND REPAIR

J. KOSHORST (Airbus Industrie, Blagnac, France) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 207-217. refs

The current status of advanced composite applications in aircraft is discussed using the Airbus A310 as an example. In particular, attention is given to design and fabrication concepts for inner airbrakes, rudder, and leg fairings as well as repair considerations, including damage evaluation and details of several repair solutions. An outline of a repair training program is presented.

A92-47417

A FIELD REPAIR OF ADVANCED HELICOPTER VERTICAL FIN STRUCTURE

MICHAEL J. HOKE IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 219-227.

Copyright

The actual field repair of a carbon fiber structure in a HH-65A helicopter is described. The discussion covers methods for initial damage assessment, including paint removal and plotting of the damage zone using tap testing visual inspection; removal of the damaged material; the development of a new repair procedure; and verification of the repair integrity. The need for standardizing repair materials and techniques for advanced composite structures is emphasized.

V.L.

A92-47592

GERMAN-GUS COOPERATION IN CIVIL AVIATION [KOOPERATION DEUTSCHLAND-GUS IN DER ZIVILEN LUFTFAHRT]

MICHAEL HAUGER Luft- und Raumfahrt (ISSN 0173-6264), vol. 13, no. 3, May-June 1992, p. 16-18, 20, 22, 23. In German.

German-Russian cooperation in the development of aircraft technologies is discussed. Emphasis is given to plans for a hydrogen-fueled 'cryoplane' and the MTU-CRISP propfan. The economic costs of these developments are addressed. C.D.

A92-47655

RESEARCH OF ENVIRONMENTAL SPECTRUM FOR AIRCRAFT STRUCTURE

XI-YUAN ZHOU and SHU-KUI YU Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A121-A127. In Chinese. refs

The definition of the environmental spectrum for the verification of aircraft structure is presented together with basic methods for designing the spectrum. The total environments for various climate regions and typical flying regions for aircraft are statistically analyzed, and the observed data, including atmospheric temperature, air humidity, solar radiation, sulfur dioxide content, the seawater salinity, and salt fog, are provided. The use of these results for designing a structural integrity test is described.

A92-47660

OPTIMAL MAINTENANCE PROGRAM OF DAMAGE TOLERANCE STRUCTURE

ZHE WU (Northwestern Polytechnical University, Xian, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A163-A169. In Chinese. refs

A method for analyzing a damage tolerance structure and for assessing the structure's reliability is described, and the basic concepts involved are discussed. The possible damage and failure states of the damage tolerance structure are defined, and the loss caused by each state is analyzed. The results are used to develop a series of mathematical models for calculating expected costs and losses in the period of the structure remaining life. An example for optimizing a maintenance program for an aircraft substructure is presented.

A92-47670

ECONOMIC LIFE ANALYSIS FOR REPLACING COMPONENTS

YOU-PING CHEN and CHUAN-YAO CHEN (Huazhong University of Science and Technology, Wuhan, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A214-A218. In Chinese. refs

An economic life analysis for replaceable components, such as hubs on aircraft wheels, was carried out. It was found that the period for economical maintenance and the limits of this period, T(L) and T(U), can be calculated using a quantitative criterion proposed recently by the authors for the evaluation of maintenance economy. It is shown that the economic life, (Te), of a component may be calculated using the relationship Te = min(T(U)Tc), where Tc is the lifetime of the allowable critical damage, which may be estimated by available methods for fatigue lifetime prediction.

I.S.

A92-47757

DAWN OF STEALTH

Lockheed Horizons (ISSN 0459-6773), no. 30, May 1992, p. 4-15. Copyright

An overview is presented of the early development of the F-117 fighter and the evolution of studies to develop fighter aircraft with significantly reduced radar detectability. One significant breakthrough was the concept of reducing the complex shape of a traditional aircraft to a finite set of 2D surfaces, thus facetting, or creating a 3D aircraft, not out of smooth, gracefully curved surfaces, but out of a collection of flat panels.

R.E.P.

A92-47758

THE TONOPAH YEARS

Lockheed Horizons (ISSN 0459-6773), no. 30, May 1992, p. 16-27.

Copyright

An overview is presented of the facilities, security arrangements and flight activities at the Tonopah test range in Nevada during the development of the F-117 stealth fighter. For the first six years, the aircraft operated strictly at night, compressing the intensity of realistic combat scenarios into increasingly demanding training missions. Attention is given to evolution of the training

program, introduction of flight simulators and the formation of formal USAF operational squadrons.

A92-47774

INDUSTRIAL PRACTICE IN AERONAUTICAL MAINTENANCE (PRATIQUES INDUSTRIELLES EN MAINTENANCE **AERONAUTIQUE**]

M. C. LECLERCQ and G. MERET (Air France, Direction du Materiel, Orly) (Societe Française des Mecaniciens and FIMTM, Journees sur l'Integrite des Structures, Courbevoie, France, Apr. 18, 19, 1991) Revue Française de Mecanique (ISSN 0373-6601), no. 1, 1992, p. 45-47. in French.

Copyright

A review is presented covering industry practices in the area of aircraft maintenance. An example is given showing that a 747 aircraft undergoes 16 hours of maintenance for every hour of flight. Maintenance time is broken down into the various hours spent on light maintenance and heavy maintenance for airframe and engines and other major components. R.E.P.

CIS ENGINES. I - THE RANGE REVEALED

KEN FULTON Air International (ISSN 0306-5634), vol. 43, no. 1, July 1992, p. 34-39.

A review is presented of the background and development of current production engines being offered by the aerospace industries of Russia and Ukraine. The restructuring of the various principal engine design bureaus, manufacturing plants, and the aggregate plants producing engine fuel and control system components, and other system devices is described. Current gas turbine and piston engines are listed showing maximum takeoff thrust and aircraft applications.

Δ92-47971

B-1B EXCELS IN CONVENTIONAL ROLE

WILLIAM B. SCOTT Aviation Week and Space Technology (ISSN 0005-2175), vol. 137, no. 4, July 27, 1992, p. 40-42.

A report is presented of an observational flight performed in a USAF B-1B to better understand the operational aspects of the aircraft's new conventional bombing mission as an integral element of a multiaircraft tactical strike package. The basic flight plan consisted of a standard takeoff and climb, cruising to the training area at 22,000 ft, descending for a 400 ft low-level run, making two simulated bomb drops, and climbing back to 25,000 ft for the return to base. Attention is given the new/enhanced avionics, the ALQ-161 defensive electronic warfare system and ripple-release Mk. 82 bombing procedures. R.E.P.

A92-48426

NAECON 91; PROCEEDINGS OF THE IEEE NATIONAL AEROSPACE AND ELECTRONICS CONFERENCE, DAYTON, OH, MAY 20-24, 1991. VOLS. 1-3

Conference sponsored by IEEE. New York, Institute of Electrical and Electronics Engineers, Inc., (ISSN 0547-3578), 1991, p. Vol. 1, 509 p.; vol. 2, 492 p.; vol. 3, 398 p. For individual items see A92-48427 to A92-48576.

(ISBN 0-7803-0084-X) Copyright

Various papers on digital control technology and avionics subsystem and weapon technology are presented. The general topics addressed include: VLSI, components, and packaging; signal processing; data transmission; advanced avionics architecture; optical applications; information control and display; data storage; airborne image processing; airborne radar and fire control; navigation; weapon guidance and interface; Kalman filtering; power generation and control; command, control, and communications. C.D.

TRENDS IN COMMERCIAL AIRCRAFT DESIGN - WHAT **EVOLUTION FACTORS AND WHAT APPROACH?**

JEAN-PIERRE MAREC (ONERA, Chatillon, France) ONERA,

TP no. 1992-25, 1992, 40 p. Translation. Previously cited in issue 09, p. 1304, Accession no. A91-26087. (ONERA, TP NO. 1992-25)

A92-49049#

FLEXIBLE MANUFACTURING IN REPAIR OF GAS TURBINE **ENGINE COMPONENTS**

KIRK DE PRITER (U.S. Navy, Naval Engine Airfoil Center, Cherry Point, NC), ANDREW N. VAVRECK, ERIC J. LITTLE, LESLIE D. JOHNSON, and BRETT D. SAYLOR (Pennsylvania State University, State College) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 5 p. (Contract N00039-88-C-0051)

(AIAA PAPER 92-3524) Copyright

The U.S. Naval Engine Airfoil Center has led in the creation of three flexible manufacturing system (FMS) work-cell components. These workcells accomplish gas turbine blade cleaning, metal removal, welding, coating, brazing, and HIP rejuvenation. These functions are further elaborated by connecting the cells with toolrooms and materials supplies, using automated guided vehicles and an automated storage and retrieval system. The ability of an FMS to rapidly adapt to work part-quantities and repair procedures has proven critically important to the Center's handling of its constantly varying workload, especially in the case of small batch sizes.

Air Force Inst. of Tech., Wright-Patterson AFB, N92-28348# OH. School of Systems and Logistics.

LIFE CYCLE COSTS OF THE C-130 ELECTRICAL POWER SYSTEM UPGRADE M.S. Thesis

THEODORE D. SEYMOUR Sep. 1991 141 p. (AD-A246759; AFIT/GLM/LSQ/91S-57) Avail: CASI HC A07/MF A02

This research investigated the life cycle costs of three alternative electrical power systems for a planned electrical system upgrade to the C-130 transport aircraft. Research identified the contractors as Sundstrand, Westinghouse, and Leland. The literature review included discussions on the C-130, electrical power systems and the proposed alternatives, and the elements of life cycle cost analysis. In the discussion on supportability issues, this research evaluated changes in mission capable rates and the needed fleet size to perform the current mission. In estimating Operating and Support costs, this research used the analogy approach. Analogies were based on expert opinions of Air Force and industry engineers. Sensitivity analysis was then performed on these expert's predictions to help in the formation of conclusions. The system performance of all options netted similar results. However, Alternative 3 had the lowest total life cycle costs. making it the most cost effective option. This research concluded the Leland proposal to be the best choice and recommends implementation of the proposal.

N92-28522# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Mechanics Panel.

PILOTED SIMULATION EFFECTIVENESS (L'EFFICACITE DE LA SIMULATION PILOTEE

In ENGLISH and FRENCH Feb. 1992 349 p Symposium held in Brussels, Belgium, 14-17 Oct. 1991

(AGARD-CP-513; ISBN-92-835-0656-1; AD-A253007) Copyright

Avail: CASI HC A15/MF A03

The ability of piloted simulators to represent military and civil aviation operational tasks with ever increasing levels of fidelity is leading to a steady growth in their use for all areas of aviation from new concept studies, through support for development and flight clearance, to training aircrews for complex missions. The papers here present a variety of experience of the effectiveness of simulation for many of the key areas of application. This session focuses on: the use of simulation in aircraft development programs; the use of simulation in developing piloting skills; the use and potential of simulation in full mission training for military roles; and the effectiveness of simulation for a variety of research tasks.

N92-29874# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Helicopter Div.

REPAIR PROCEDURES FOR ADVANCED COMPOSITES FOR HELICOPTERS

HERMANN ESCHBAUMER 1991 25 p Presented at the 17th European Rotorcraft Forum, Berlin, Fed. Republic of Germany, 24-26 Sep. 1991

(MBB-UD-0606-91-PUB; ETN-92-91696) Avail: CASI HC A03/MF A01

Standard repair procedures and the various solutions determined for structural repairs are discussed. Repairs on load introduction areas and extensive damages were rated to require specific repairs and therefore assistance of stress design. Specific repairs are not discussed. Standard repairs applicable for primary and secondary structures are referred to. The differences between 'in house repairs', 'depot and on aircraft repairs', and 'field repairs' are clarified. Suitable nondestructive test techniques for nonstationary inspection are considered and aspects to transfer the required standard repair procedures to maintenance personnel are discussed.

N92-30122*# Northwest Airlines, Inc., Minneapolis, MN. CURRENT AND FUTURE DEVELOPMENTS IN CIVIL AIRCRAFT NON-DESTRUCTIVE EVALUATION FROM AN OPERATOR'S POINT OF VIEW

JEFF REGISTER In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 279-282 Jul. 1992

Avail: CASI HC A01/MF A04

In June, 1988, the first International Conference on aging aircraft was held to address nondestructive tests (NDT) of aging aircraft and other issues. From this meeting, a research program was initiated and funded by the FAA. As a result of this program, a lot of work has been done to study current NDT practices in the aviation industry and secondly, to research and develop new NDT methods to improve the reliability and efficiency of in-service inspection of aircraft structures and powerplants. The following is an overview of the current and future developments in civil aircraft NDT, as viewed by an air carrier and the concerns for NDT in the future.

N92-30232# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Hubschrauber und Flugzeuge.

ACQUISITION OF AN AEROTHERMODYNAMIC DATA BASE BY MEANS OF A WINGED EXPERIMENTAL REENTRY

E. H. HIRSCHEL, H. GRALLERT, J. LAFON, and M. RAPUC 19 Aug. 1991 40 p Sponsored in part by ESA (MBB/FE202/S/PUB/461; ETN-92-91903) Copyright Avail: CASI HC A03/MF A01

A winged aerothermodynamic experimental reentry vehicle is proposed in order to verify and validate the methods of numerical aerothermodynamics as design tool additional to the classical tools, i.e., the wind tunnel. Experimental hypersonic vehicles are reviewed and the aerothermodynamic characteristic of reentry vehicles and the ground simulation problems are considered. The possible configuration and trajectory of a winged experimental vehicle are discussed, together with the required and possible measurements, and the data management and recovery. Use of the obtained data base in the establishment of the methods of numerical aerothermodynamics as additional design tool is outlined.

02

AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

A92-45263* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HIGH-REYNOLDS-NUMBER TEST REQUIREMENTS IN LOW-SPEED AERODYNAMICS

D. M. BUSHNELL and G. C. GREENE (NASA, Langley Research Center, Hampton, VA) IN: High Reynolds number flows using liquid and gaseous helium. New York, Springer-Verlag, 1991, p. 79-85. refs
Copyright

Research requirements to an ultra-high-Reynolds-number liquid helium facility are reviewed. Aerodynamic research areas under consideration include wave vortex hazard reduction, vortex control and diagnostics for maneuvering fighter aircraft, and performance of high-lift devices.

O.G.

A92-45318 PREDICTION AND MEASUREMENT OF JET FLOWFIELD FEATURES FOR ASTOVL AIRCRAFT

J. MCGUIRK, G. J. PAGE, N. SAKELLARIOU (Imperial College of Science, Technology, and Medicine, London, England), J. E. FLITCROFT, W. ABBOTT, D. R. WHITE (Royal Aerospace Establishment, Pyestock, England), and P. TATTERSALL (Royal Aerospace Establishment, Farnborough, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.6.1-III.6.9. Research supported by Ministry of Defence Procurement Executive. refs

Results from a program of experimental and theoretical research on ASTOVL jet flows are presented. The experimental investigations explore how the supersonic exhaust jet velocities on ASTOVL aircraft affect features of the jet flowfield during landing. The implications for the viability of modeling techniques used to assess the severity of hot-gas ingestion behavior are examined. Flowfield measurements are presented for the ground plane and interjet fountain produced by twin impinging jets, at nozzle pressure ratios up to 4:1. Inlet temperature rise characteristics observed using a two-poster simplified aircraft configuration model, operating with jet conditions up to full ASTOVL powerplant pressures and temperatures, are also discussed. Progress with the development of a transonic flow version is described and demonstrated by comparisons with measurements from the experimental work.

C.A.B.

A92-45324

THE EXPERIMENTAL AND COMPUTATIONAL STUDY OF JET IMPINGEMENT FLOWFIELDS WITH REFERENCE TO VSTOL AIRCRAFT PERFORMANCE

A. G. SMITH (S & C Thermofluids, Ltd., Kelston, England), D. N. ING, and P. J. BAILEY (Logico Systems, Ltd., East Horsley, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.13.1-III.13.15. refs Copyright

Jet flowfields generated by ASTOVL aircraft in ground effect have been studied experimentally and computationally. The general aspects of single-, twin- and three-jet impingement are described via experimental information obtained using laser sheet and schlieren photography as well as ground and underfuselage surface pressure measurements. The implications for ASTOVL aircraft performance are discussed. The results obtained by the use of two general purpose computational fluid dynamic packages for the prediction of such flowfields are presented and the design capability explored.

A92-45385

SPACEPLANE LONGITUDINAL AERODYNAMIC PARAMETER ESTIMATION BY CABLE-MOUNT DYNAMIC WIND-TUNNEL TEST

SHUICHI SASA, MINORU TAKIZAWA, TAKASHI SHIMOMURA, and OSAMU NONAKA (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 141-149. refs (SAE PAPER 911980) Copyright

Cable-mount dynamic wind-tunnel tests were conducted in a low-speed wind tunnel for the purpose of extracting aerodynamic parameters of a 5 percent spaceplane model. The cable-mount dynamic wind-tunnel experiment is described. An identification technique composed of flight path reconstruction and regression analysis and the maximum likelihood method for the identification of the parameters in the linear dynamic system were applied to the wind-tunnel test data. The estimation results for the aerodynamic parameters obtained by the two methods are compared.

A92-45386

EXPERIMENTAL STUDIES ON AERODYNAMIC CHARACTERISTICS OF SSTO VEHICLE AT LOW SUBSONIC SPEEDS

YOSHITO MIYAMOTO, TOSHIMI FUJITA, AKIHITO IWASAKI, and HIROTOSHI FUJIEDA (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 151-158.

(SAE PAPER 911981) Copyright
For a fully reusable space transportation system of an SSTO of the horizontal takeoff and landing type, experimental studies on low-speed aerodynamic characteristics have been done. Wind tunnel tests were conducted using NAL's gust wind tunnel. Six-component force and moment data were obtained over an angle of attack range from -14 to 44 deg. In this paper, aerodynamic tests results are presented for the low-speed aerodynamics of a generic SSTO configuration.

Author

A92-45390* National Aeronautics and Space Administration, Washington, DC.

COMPUTATIONAL AERODYNAMICS - THE NEXT GENERATION

KRISTIN A. HESSENIUS and PAMELA F. RICHARDSON (NASA, Aerodynamics Div., Washington, DC) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 201-215. refs (SAE PAPER 911988) Copyright

Continued advances in the various elements that comprise the field of computational fluid dynamics (CFD) are promoting a radically different approach to the aerodynamic design and analysis of aerospace vehicles and systems. The elements of CFD generally include numerical algorithm development, transition and turbulence modeling, surface modeling, and grid generation, scientific visualization and validation methodologies. This paper discusses the research progress and prospects for the future in each of these elements within NASA's CFD and Experimental Validation Program. The applicability of computational methods for the purposes of understanding complex flow phenomena, exploring aerodynamic concepts, and providing vehicle-design input is also addressed.

A92-45391

THE IMPACT OF CFD ON THE AIRPLANE DESIGN PROCESS - TODAY AND TOMORROW

RONALD L. BENGELINK and PAUL E. RUBBERT (Boeing Commercial Airplane Group, Seattle, WA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium,

29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 217-226. refs (SAE PAPER 911989) Copyright

CFD codes that play a central role in aircraft design are discussed. Requirements and limitations of CFD for high speed airfoil and wing design, landing and takeoff with flaps deployed, and stability and control are addressed. The importance of timely and accurate design is stressed.

C.D.

A92-45392

COMPUTATIONAL AERODYNAMICS IN AIRCRAFT DESIGN -CHALLENGES AND OPPORTUNITIES FOR EULER/NAVIER-STOKES METHODS

P. RAJ (Lockheed Aeronautical Systems Co., Burbank, CA) and S. W. SINGER (Lockheed Advanced Development Co., Sunland, CA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 227-239. Research supported by Lockheed Corp. refs

(SAE PAPER 911990) Copyright

Present capabilities and limitations of the Euler/Navier-Stokes methods are examined to help identify the areas of opportunities and challenges that lie ahead. Solutions obtained using a state-of-the-art 3D Euler/Navier-Stokes Method (TEAM) are presented for four test cases ranging from an airfoil to the complete advanced tactical fighter prototype configuration. Four levels of CFD codes for estimating aerodynamic characteristics of aircraft configurations are discussed. The higher-level CFD methods, which cover a large region of a design space characterized by speed and angle of attack, are found to provide more accurate aerodynamic data over a wider range of flight conditions than the lower-level methods. The challenge lies in enhancing the effectiveness of the Euler/Navier-Stokes methods to be comparable to that of the potential-flow methods. C.A.B.

A92-45393

NUMERICAL SIMULATIONS OF SEPARATED FLOWS AROUND OSCILLATING AIRFOIL FOR DYNAMIC STALL PHENOMENA

SHIGERU ASO, ATSUHIRO SAKAMOTO (Kyushu University, Fukuoka, Japan), and MASANORI HAYASHI (Nishinippon Institute of Technology, Fukuoka, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 241-248. refs (SAE PAPER 911991) Copyright

A92-45394

COMPUTATIONAL FLUID DYNAMICS APPLICATIONS IN AIRPLANE CABIN VENTILATION SYSTEM DESIGN

FRED ABOOSAIDI, MATTHEW J. WARFIELD (Boeing Co., Seattle, WA), and DIPANKAR CHOUDHURY (Creare, Inc., Hanover, NH) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 249-258. refs

(SAE PAPER 911992) Copyright

Two three-dimensional cabin airflow configurations have been the subject of experimental and analytical testing to establish the validity and role of computational fluid dynamics (CFD) tools in the design of cabin airflow distribution systems. The CFD tools considered here are two separate Navier-Stokes computer codes which have been used for a number of applications, including those in the present study. A correlative study of a detailed air supply nozzle configuration has been examined to further understand its flow characteristics and to establish a procedure for examining cases with large scale differences. The comparison of experimental results with the numerical simulations in the two cases is generally quite good, leading to an increased confidence in the application of CFD methods within the cabin airflow distribution system design arena.

A92-45395

WIND TUNNEL INVESTIGATION OF AN IMPROVED UPPER SURFACE BLOWN FLAP TRANSPORT SEMI-SPAN MODEL

HITOSHI TAKAHASHI, MASAHIRO OKUYAMA, HIROTOSHI FUJIEDA, TOSHIMI FUJITA, and AKIHITO IWASAKI (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 259-267. refs (SAE PAPER 911993) Copyright

This paper describes the investigations which have been conducted to improve the aerodynamic characteristics of a subsonic jet transport semi-span model with an Upper Surface Blowing Flap system which has been newly designed using the NAL STOL CAD program. The tests were conducted in the NAL 2 by 2 meter Gust Wind Tunnel and results were obtained for several flap and slat deflections at engine thrust coefficents from 0 to 1.85.

Author

A92-45401

RESPONSE CHARACTERISTICS OF A WING IN SUPERSONIC FLOW NEAR FLUTTER BOUNDARY

HIROSHI TORII (Meijo University, Nagoya, Japan) and YUJI MATSUZAKI (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 309-314. refs (SAE PAPER 911999) Copyright

The subcritical flutter characteristics of wings in a supersonic flow are examined. Especially the scattering property of the criterion parameters which are used in order to estimate a flutter boundary, is studied. The wing response due to the flow turbulence is expressed by the autoregressive moving-average process through Akaike's estimation procedure. The wing stability is evaluated by applying the Jury's stability determinant method for a discrete system to the estimated time series model. The flutter boundary is predicted by plotting the Jury's stability criterion parameter at several dynamic pressures in the subcritical range. As the dynamic pressure approaches to the flutter boundary, the estimated stability parameter and its scattering monotonically decreases while the damping, the conventional flutter estimation criterion, scattered so much near the flutter boundary.

A92-45404

RECENT APPLICATIONS OF THE FNS ZONAL METHOD TO COMPLEX FLOW PROBLEMS

KOZO FUJII and YOSHIAKI TAMURA (Institute of Space and Astronautical Science, Sagamihara, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 341-350. refs (SAE PAPER 912003) Copyright

A newly developed zonal technique utilizing the interface scheme based on the Fortified Navier-Stokes concept is applied to steady and unsteady flow problems. Two computational results are given as application cases to unsteady flow problems. The results show that this technique alleviates the difficulty of the simulation of complex flow configuration. It is shown that several types of zonal approach including overlaid, overlapped, and multiblock methods are treated in the same manner under this concept, and that the present zonal method can make a conventional program be an effective CFD tool for the analysis of complex flow configuration.

A92-45405

FREE WAKE ANALYSES OF A HOVERING ROTOR USING PANEL METHOD

GIZO HASEGAWA, HIROYUKI NAKAGAWA, TAKASHI SATO, and TOMOARI NAGASHIMA (National Defense Academy, Yokosuka, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive

Engineers, Inc., 1991, p. 351-364. refs (SAE PAPER 912004) Copyright

Employing a higher order vortex panel technique, 3D wake analyses are conducted for a rotor in hover. New methods are proposed to incorporate wake deformations due to wake-ground interactions into performance predictions. Numerical results of wake geometries for rotors at close proximity and isolated to inclined ground surface are presented and advantages of the proposed method are discussed.

R.E.P.

A92-45408

AN ECONOMIC APPROACH TO ACCURATE WING DESIGN

TUNCER CEBECI and JOHN E. KING (California State University, Long Beach) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 383-392. refs (SAE PAPER 912008) Copyright

An interactive boundary-layer method is described for computing three-dimensional transonic flows on wing/body configurations. The method combines Euler solutions with viscous flow solutions obtained from an inverse boundary-layer method with an interaction law based on the extension of the Hilbert integral formulation used for two-dimensional flows. Depending on the complexity of the flowfield, two versions of teller's box scheme are used, the regular box scheme in regions of positive crossflow and no separation, and the characteristic box scheme in regions of negative crossflow and flow separation. Preliminary calculations performed for a modern transport wing show good agreement with experimental data and indicate that wing/body configurations in transonic flows can be analyzed with good accuracy with this method at substantial savings of computer time.

A92-45409

FLOW FIELD AROUND THICK DELTA WING WITH ROUNDED LEADING EDGE

YOSHIJI NAKAJIMA, YOSHIYUKI NAKAO, YOSHIAKI NAKAMURA, and MICHIRU YASUHARA (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 393-404. refs (SAE PAPER 912009) Copyright

A thick delta wing with a rounded leading edge has been experimentally studied. To understand the basic flowfield of such a wing, experiments have been conducted in the low-speed wind tunnel at Nagoya University. Three types of flow visualization: oil flow, smoke wire, and tuft methods are employed, and forces: lift and drag, and pressure distributions were also obtained. The same test has been conducted for a thin delta wing for comparison. The results show the different flowfield of the thick delta wing from those commonly known for delta wings. However, in other properties except for the flow pattern, similarities were observed between the thick delta wing and thin delta wing.

A92-45412

NUMERICAL SIMULATION OF A SUPERSONIC JET IMPINGEMENT ON A GROUND

NOBUYUKI TSUBOI, A. K. HAYASHI, TOSHI FUJIWARA (Nagoya University, Japan), KAZUO ARASHI (Churyo Engineering Co., Ltd., Aerodynamics Research Dept., Nagoya, Japan), and MASARU KODAMA (Mitsubishi Heavy Industries, Ltd., Nagoya Aircraft Works, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 421-433. refs (SAE PAPER 912014) Copyright

The impingement on the ground of underexpanded uniform and nonuniform axisymmetric supersonic jets at atmospheric conditions is simulated numerically using 2D and cylindrically symmetric Euler equations for a perpendicular ground and 3D Euler equations for ground inclined from 0 to 45 deg. The numerical results are compared with those of an experimental study of

underexpanded axisymmetric supersonic N2 jets impinging on a ground which inclines from 0 to 45 deg. The results of experiments showed that the maximum pressure on the inclined ground is larger than that on the perpendicular ground due to the possibility of high pressure recoveries through multiple shock systems. I.S.

A92-45413

AERODYNAMIC CHARACTERISTICS NEAR THE TIP OF A FINITE WING BY A PANEL METHOD

JANGSOO CHOI and YOSHIYUKI SUGIYAMA (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 435-443. refs (SAE PAPER 912020) Copyright

The aerodynamic characteristics around a wing tip are investigated with a first order panel method. The geometry chosen for the study is a rectangular wing of aspect ratio 8.43, with RAF6 airfoil of 10 percent thickness ratio. The panel method gives similar aerodynamic characteristics to experimental ones even near the tip, such as a dominant suction pressure distribution present near the trailing edge around the tip, and the increase in the local lift and drag at the very narrow region of the tip. These properties are caused by the strong spanwise velocity component around the wing tip, the inviscid effects of which are described in detail, with respect to pressure coefficient, local lift and drag coefficients, downwash, and vorticity on the wing.

A92-45414 AERO-STRUCTURAL INTEGRATED DESIGN OF FORWARD SWEPT WING

JUNICHI MIYAKAWA (Mitsubishi Heavy Industries, Ltd., Tokyo, Japan), TAKESHI OHNUKI, and NOBUHIKO KAMIYA (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 445-450. refs (SAE PAPER 912021) Copyright

Forward swept wing (FSW) is known to have excellent performance relative to aft swept wing. The practical application, however, has been limited due to its structural divergence characteristics. The current progress in materials, especially anisotropic composites has opened up a new future for FSW. This paper describes a design study of FSW for transonic transport looking for high drag divergence performance. Inverse code is applied to FSW aerodynamic design to achieve an isobar design concept. The performance is verified by transonic wind tunnel test. The paper also mentions the development of aero-structural integrated design tool, a combination of aerodynamic analysis code and structural analysis code, which is essential to FSW wing development.

A92-45417

EXPERIMENTAL AND NUMERICAL STUDIES OF RADIATION EMISSION FROM HIGH-TEMPERATURE AIR BEHIND 10 KM/S SHOCK WAVES

HIROKI HONMA (Chiba University, Japan) and HIROYUKI IIZUKA (Mitsubishi Atomic Power Industries, Inc., Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 471-482. refs

(Contract MOESC-61420021; MOESC-63302022;

MOESC-02252105; MOESC-03238105)

(SAE PAPER 912025) Copyright

In order to estimate the exact heat transfer from shock-heated air to the reentering space vehicles, accurate understanding if its radiative characteristics is needed. The 10 km/s shock waves are produced by a free-piston, double-diaphragm shock tube, and the total and spectral-resolved radiation intensities of the shocked air are observed by using an image converter camera and a pair of photomultipliers. The numerical analysis is carried out for 1D steady hypersonic flows with nonequilibrium chemical reactions of hot

air, including the evaluation of radiation intensity. The double-peak characteristic of radiation intensity for the shock waves above 10 km/s and the time-lag of radiation peak for different wave length are experimentally observed and qualitatively reproduced in numerical simulation.

Author

A92-45418

MULTIDIMENSIONAL EULER/NAVIER-STOKES ANALYSIS FOR HYPERSONIC EQUILIBRIUM GAS

TAKUJI KISHIMOTO (Kawasaki Heavy Industries, Ltd., Gifu Technical Institute, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 483-490. Research supported by NASDA. refs

(SAE PAPER 912026) Copyright

Numerical simulations of hypersonic flow around a 2D cylinder and a 3D complete reentry vehicle have been carried out by solving Euler/Navier-Stokes equations which incorporate the equation of state for an equilibrium gas. The governing equations are solved by an implicit finite volume total variation diminishing upwind scheme using a two-equation turbulence model for a viscous flow. Curve-fits for the thermodynamic and transport properties of an equilibrium air are adopted in order to estimate real gas effects. Convective fluxes are calculated by the Roe's approximate Riemann solver generalized for an equilibrium gas. The results of hypersonic flow analysis using this code suggest that the real gas effects, such as chemical reaction, are not negligible to predict the hypersonic flow characteristics accurately.

A92-45419

A CALCULATION OF PENETRATION OF THE JET ISSUING NORMALLY INTO A CROSS FLOW ACROSS A WALL BOUNDARY LAYER

YOSHIYUKI SUGIYAMA (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 491-500. refs (SAE PAPER 912029) Copyright

An increase in jet penetration due to the wall boundary layer is determined in the flow field, including an aerodynamic interference between the wall boundary layer and the jet. The aerodynamic effect of the wall boundary layer is replaced by that of a secondary vortex filament resulting from vorticity in the wall boundary layer. A differential equation governing the increase in jet penetration is derived using the circulation around the secondary vortex filaments, its induced velocity, and the empirical decay law of the jet axial velocity along the jet centerline. A numerical example of the present analysis shows good agreement with the experiment. This indicates that the vortex flow model used simulates the real flow conditions.

A92-45427

SHOCK INTERACTION INDUCED BY TWO HEMISPHERE-CYLINDERS

TETSUYA NAGASHIMA, YOSHIAKI NAKAMURA, MICHIRU YASUHARA, and KIYOSHI TSUBOI (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 581-589. refs

(SAE PAPER 912043) Copyright

A type IV interaction caused by a shock generated by a large hemisphere cylinder impinging on a blunt body was measured. The stagnation pressure coefficient increased by more than 5.0, or 2.8 times larger than without the interaction. The pressure decrease on the side opposite the shock was more rapid than on the impinging side. The detailed pattern of the interaction was studied using 2D numerical simulations. The results showed that the supersonic jet impinges on the subsonic region and that compression and expansion waves formed. The pressure and heat

transfer distribution along the body surface were eight and four times as large, respectively, as those without the interaction.

C.D.

A92-45428

AERODYNAMIC HEATING IN THREE-DIMENSIONAL SHOCK WAVE TURBULENT BOUNDARY LAYER INTERACTION INDUCED BY SWEPTBACK SHARP FINS IN HYPERSONIC

SHIGERU ASO, SHOUZO MAEKAWA (Kyushu University, Fukuoka, Japan), and MASANORI HAYASHI (Nishinippon Institute of Technology, Fukuoka, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 591-598. refs (SAE PAPER 912044) Copyright

For the fundamental study of aerodynamic heating of winged vehicle and space planes in hypersonic flow, the detailed structure of 3D shock wave/turbulent boundary layer interaction region induced by swept-back sharp fins is investigated by oil flow technique and pressure distribution. The major objectives were to study the effects of the shape of the leading edge of the fin to the flow fields on the body and to study the effects of the sweep angle of the leading edge of the fin to the interaction region. Also, aerodynamic heating phenomena in the flow fields are investigated by using a new technique. For the measurements, a new method of measuring heat flux is used. The new method is based on a new type of thin-film heat transfer gauge with high spatial resolution and fast response. The results suggest the effects of the shape of the leading edge to the flow fields are quite significant and the sweep of the leading edge of the fin to freestream is quite important to reduce the interaction region.

Author

A92-45429

NUMERICAL SIMULATIONS OF HYPERSONIC REAL-GAS FLOWS OVER SPACE VEHICLES

MASAHIRO NAKAO (Mitsubishi Heavy Industries, Ltd., Tokyo, Japan) and KOZO FUJII (Institute of Space and Astronautical Science, Sagamihara, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 599-606. refs (SAE PAPER 912045) Copyright

Hypersonic flows over simple 3D bodies and a space vehicle are simulated using a real-gas Navier-Stokes code under an equilibrium air assumption. This code is based on 3D upwind flux splitting scheme with generalized Roe's Riemann solver. The real-gas effect is incorporated using the VEG (Variable Equivalent Gamma) method. The equivalent gamma and other thermodynamic properties are calculated using empirical curve fits.

A92-45443

OSCILLATION OF OBLIQUE SHOCK WAVES GENERATED IN A TWO DIMENSIONAL ASYMMETRIC NOZZLE

FUMIO HIGASHINO, SHIGERU MATSUO (Tokyo Noko University, Koganei, Japan), and TARO TSUYUKI (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 749-757. Research supported by MOESC. refs

(SAE PAPER 912061) Copyright

The development and the oscillation phenomena of pseudoshock waves in a 2D asymmetric nozzle are investigated experimentally. A shock tube was used to generate supersonic flows in nozzles which consisted of both short and long walls diverging in the flow direction. The oscillation frequencies were determined from pressure measurements by means of a piezo-pressure transducer fixed at different loci. It was found that an oblique shock wave appeared near the turning corner of the diverging section owing to a separation vortex, and then it developed into a pseudoshock wave. The supersonic flow that

issued from the duct was not significantly expanded in the flow direction and behaved like an underexpanded jet which was deflected toward the shorter wall of the nozzle. The oscillation frequency was not affected by the initial pressure. When the initial pressure decreased, the oscillation amplitude increased. C.A.B.

A92-45445

NUMERICAL ANALYSIS OF RCS JET IN HYPERSONIC FLIGHTS

YUMIKO INOUE, A. K. HAYASHI, TOSHI FUJIWARA (Nagoya University, Japan), SHO MIYAKE, and TADASHI KATSURAHARA (Mitsubishi Heavy Industries, Ltd., Nagoya Aircraft Works, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 767-774. refs

(SAE PAPER 912063) Copyright

A transversely injected jet into a hypersonic flow is simulated numerically in order to study the flow field of the injection jet in the hypersonic atmosphere, its heat flux on the body surface, and the moments working on the body. The flow field is governed by the 2D Reynolds-averaged full Navier-Stokes equations with an algebraic eddy viscosity model developed by Baldwin-Lomax. The governing equations are solved using the Harten-Yee type TVD and central difference schemes for the convex and viscous terms, respectively. The real gas effect is considered in the numerical analysis. The jets injected across the main flow of Mach 10 and 15 are compared.

A92-45476

AIAA APPLIED AERODYNAMICS CONFERENCE, 10TH, PALO ALTO, CA, JUNE 22-24, 1992, TECHNICAL PAPERS. PTS. 1 &

Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. Pt. 1, 520 p.; pt. 2, 533 p. For individual items see A92-45477 to A92-45569.

Consideration is given to vortex physics and aerodynamics; supersonic/hypersonic STOL/VSTOL/rotors; aerodynamics; missile and reentry vehicle aerodynamics; CFD as applied to unsteady aerodynamics; supersonic/hypersonic aerodynamics; low-speed/high-lift aerodynamics; airfoil/wing aerodynamics; measurement techniques; CFD-solvers/unstructured grid; airfoil/drag prediction; high angle-of-attack aerodynamics; and grid methods. Particular attention is given to transonic-numerical investigation into high-angle-of-attack leading-edge vortex flow, prediction of rotor unsteady airloads using vortex filament theory, rapid synthesis for evaluating the missile maneuverability parameters, transonic calculations of wing/bodies with deflected control surfaces; the static and dynamic flow field development about a porous suction surface wing; the aircraft spoiler effects under wind shear; multipoint inverse design of an infinite cascade of airfoils, turbulence modeling for impinging jet flows; numerical investigation of tail buffet on the F-18 aircraft; the surface grid generation in a parameter space; and the flip flop nozzle extended to supersonic flows.

492-45477#

NUMERICAL INVESTIGATION INTO HIGH-ANGLE-OF-ATTACK LEADING-EDGE VORTEX FLOW

J. I. VAN DEN BERG, H. W. M. HOEIJMAKERS, and H. A. SYTSMA (National Aerospace Laboratory, Amsterdam, Netherlands) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 1-11. Research supported by Netherlands Agency for Aerospace Programs. refs (AIAA PAPER 92-2600) Copyright

An Euler method is applied to the steady subsonic leading-edge vortex flow about a 65-deg sharp-edged cropped delta wing at incidences close to the incidence at which vortex breakdown is observed in wind tunnel experiments. Above a critical value of the incidence the pseudotime dependent numerical procedure fails to attain a steady-stage solution. The occurrence of this 'solution

breakdown' indicates the limits of the domain of applicability of the steady-flow Euler method for the case of subsonic leading-edge vortex flow. Analysis of the converged solution at incidences just below the critical value reveals that above the aft part of the wind the velocity and vorticity distribution within the vortex core undergoes a remarkable change.

A92-45478*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CRITICAL EFFECTS OF DOWNSTREAM BOUNDARY

CONDITIONS ON VORTEX BREAKDOWN

OSAMA KANDIL, HAMDY A. KANDIL (Old Dominion University, Norfolk, VA), and C. H. LIU (NASA, Langley Research Center, Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 12-26. refs (Contract NAG1-994)

(AIAA PAPER 92-2601) Copyright

The unsteady, compressible, full Navier-Stokes (NS) equations are used to study the critical effects of the downstream boundary conditions on the supersonic vortex breakdown. The present study is applied to two supersonic vortex breakdown cases. In the first case, quasi-axisymmetric supersonic swirling flow is considered in configured circular duct, and in the second case, quasi-axisymmetric supersonic swirling jet, that is issued from a nozzle into a supersonic jet of lower Mach number, is considered. For the configured duct flow, four different types of downstream boundary conditions are used, and for the swirling jet flow from the nozzle, two types of downstream boundary conditions are used. The solutions are time accurate which are obtained using an implicit, upwind, flux-difference splitting, finite-volume scheme.

A92-45479*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

EFFECT OF CANARD DEFLECTION ON CLOSE-COUPLED CANARD-WING-BODY AERODYNAMICS

EUGENE L. TU (NASA, Ames Research Center, Moffett Field, IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 27-40. refs

(AIAA PAPER 92-2602) Copyright

The thin-layer Navier-Stokes equations are solved for the flow about a canard-wing-body configuration at transonic Mach numbers of 0.85 and 0.90, angles of attack from -4 to 10 degrees and canard deflection angles from -10 to +10 degrees. Effects of canard deflection on aerodynamic performance, including canard-wing vortex interaction, are investigated. Comparisons with experimental measurements of surface pressures, lift, drag and pitching moments are made to verify the accuracy of the computations. The results of the study show that the deflected canard downwash not only influences the formation of the wing leading-edge vortex, but can cause the formation of an unfavorable vortex on the wing lower surface as well.

A92-45480*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA

THE EFFECTS OF NOZZLE EXIT GEOMETRY ON FOREBODY **VORTEX CONTROL USING BLOWING**

NATHAN M. GITTNER and NDAONA CHOKANI (North Carolina State University, Raleigh) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 41-51. refs (Contract NCC1-46)

(AIAA PAPER 92-2603) Copyright

An experimental study has been undertaken to examine the influence of the blowing jet geometry on the effectiveness of the aft blowing technique for forebody vortex control. The experiments were conducted with a 3.0 tangent caliber ogive model at subsonic, laminar flow conditions. Asymmetric aft blowing was accomplished using both a single nozzle and a double nozzle configuration.

Detailed surface pressure measurements on the model were obtained. The experimental results show that the height and the width of the blowing jet are important parameters that determine the effectiveness of aft blowing; a broad, lowly positioned blowing jet is found to be most effective for the forebody vortex control technique using aft blowing.

A92-45482*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NUMERICAL SIMULATION OF AEROTHERMAL LOADS IN HYPERSONIC ENGINE INLETS DUE TO SHOCK IMPINGEMENT

R. RAMAKRISHNAN (Analytical Services and Materials, Inc., Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 61-71. Research supported by NASA.

(AIAA PAPER 92-2605)

The effect of shock impingement on an axial corner simulating the inlet of a hypersonic vehicle engine is modeled using a finite-difference procedure. A three-dimensional dynamic grid adaptation procedure is utilized to move the grids to regions with strong flow gradients. The adaptation procedure uses a grid relocation stencil that is valid at both the interior and boundary points of the finite-difference grid. A linear combination of spatial derivatives of specific flow variables, calculated with finite-element interpolation functions, are used as adaptation measures. This computational procedure is used to study laminar and turbulent Mach 6 flows in the axial corner. The description of flow physics and qualitative measures of heat transfer distributions on cowl and strut surfaces obtained from the analysis are compared with experimental observations. Conclusions are drawn regarding the capability of the numerical scheme for enhanced modeling of high-speed compressible flows. Author

A92-45483# **NAVIER-STOKES AND EULER SOLUTIONS FOR AN UNMANNED AERIAL VEHICLE**

BRIAN E. WAKE (United Technologies Research Center, East Hartford, CT), STEPHEN J. OWEN (Sikorsky Aircraft, Stratford, CT), and T. A. EGOLF (United Technologies Research Center, East Hartford, CT) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 72-84. refs (AIAA PAPER 92-2609) Copyright

Navier-Stokes and Euler solutions have been computed for an unmanned aerial vehicle (UAV). The unmanned aerial vehicle in this study, the Cypher under development by Sikorsky Aircraft, has an unique geometry which consists of propulsive co-axial rotors surrounded by a bluff-body shroud. The flow about this aircraft is highly three-dimensional and demonstrates strong viscous effects. Body forces were used in the flow solver to account for the presence of the rotors. Viscous and inviscid results are presented and compared with experimental data. The need for a Navier-Stokes solver for adequate flow and airloads prediction is demonstated. Calculations are compared with data for several flight conditions, and two different shroud geometries. Considering the present modeling assumptions, the correlation with experimental data is good. Author

A92-45484#

PREDICTION OF ROTOR UNSTEADY AIRLOADS USING **VORTEX FILAMENT THEORY**

KYUNG M. YOO (Korea Institute of Aeronautical Technology, Seoul, Republic of Korea) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 85-99. refs (AIAA PAPER 92-2610) Copyright

A procedure using three-dimensional lifting surface method based on vortex filament theory is developed for the prediction of unsteady airloads of multibladed rotors undergoing disturbed dynamic motions. Interblade wake effects due to vortex-phasing phenomena below the rotor blades moving in different phases of motion are numerically simulated by phase control of wake vortices' time-varying memory of each blade. The results show that the amount of lift loss is directly related to the coalescence of unsteady wake below the rotor blades. This abrupt lift loss due to unsteady wake alignment is well predicted by two-dimensional Loewy's lift deficiency function or Peters' finite-state inflow model. However, the present procedure using vortex filament theory, wherein the time-dependent interblade wake vortices are designed to travel along in the prescribed wake geometry, is an improvement over the two-dimensional unsteady rotor aerodynamic theory or the mathematical treatment of wake effect in finite-state model since the present method provides the spanwise distribution of the perturbed airloads as well as the timewise variation in a realistic Author manner.

A92-45485*# National Aeronautics and Space Administration.
Ames Research Center, Moffett Field, CA.
HIGH SPEED AERODYNAMICS OF UPPER SURFACE
BLOWING AIRCRAFT CONFIGURATIONS

LARRY D. BIRCKELBAW (NASA, Ames Research Center, Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 100-116. refs (AIAA PAPER 92-2611) Copyright

An experimental investigation of the high speed aerodynamics of Upper Surface Blowing (USB) aircraft configurations has been conducted to accurately define the magnitude and causes of the powered configuration cruise drag. A highly instrumented wind tunnel model of a realistic USB configuration was used which permitted parametric variations in the number and spanwise location of the nacelles and was powered with two turbofan engine simulators. The tests conducted in the Ames 14 Foot Transonic Wind Tunnel examined 10 different configurations at Mach numbers from 0.5 to 0.775, fan nozzle pressure ratios from 1.1 to 2.1 and angles of attack from -4 to 6 degrees. Measured force data is presented which indicates the cruise drag penalty associated with each configuration and surface pressure contour plots are used to illustrate the underlying flowfield physics. It was found that all of the tested configurations suffered from a severe drag penalty which increased with freestream Mach number, power setting and angle of attack and was associated with the presence of strong shocks and regions of separated flow in the wing/nacelle junction regions.

A92-45487#

AN IMPROVED APPROACH FOR THE COMPUTATION OF TRANSONIC/SUPERSONIC FLOWS WITH APPLICATIONS TO AEROSPACE CONFIGURATIONS

RANJIT COLLERCANDY (ONERA, Chatillon, France) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 125-140. Research supported by CNES. refs

(AIAA PAPER 92-2613) Copyright

An improved approach for numerically solving the 3D time dependent Euler equations has been developed. The cell-centered upwind finite volume methods are adopted for the spatial discretizations. Time-stepping to solve the discretized equations is carried out by an explicit three-stage Stetter's predictor-corrector scheme. This technique is found to be robust for the multiblock computations of transonic and supersonic flows. The important feature of this code is that, for transonic flows, there is no need for slope limiters. The validity of the present approach is successfully demonstrated in transonic flow conditions (NACA 0012 airfoil, ONERA M6 wing, GARTEUR F4 wing, turbofan nacelle, Hermes space plane, Hermes space plane atop its launcher Ariane 5). Even though only a limited number of supersonic test cases were computed, these confirmed the robustness and accuracy of the method. Author

A92-45490#

THREE-DIMENSIONAL ORTHOGONAL-TO-SURFACE STRUCTURED GRID GENERATION WITH TRANSONIC NAVIER-STOKES FLOW SOLUTIONS FOR A COMMERCIAL TRANSPORT CONFIGURATION

HOA V. CAO and T. J. KAO (Boeing Commercial Airplane Group, Seattle, WA) IN: AlAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 161-171. refs (AlAA PAPER 92-2616) Copyright

A simple and effective method to numerically generate 3D structured grids is proposed for a commercial transport configuration using the NASA Langley thin-layer Navier-Stokes code. The field grids are computed in such a way that the grid lines intersecting the solid boundaries are always orthogonal to these boundaries and the grid distributions necessary for viscous flow analysis along these grid lines are accurately computed. The method was successfully applied to a transonic commercial transport wing-body configuration and the NASA F16XL wing-body configuration. A grid-quality check code developed to verify the 3D grids generated is described. The orthogonal grids generated by the present method are used to compute transonic thin-layer Navier-Stokes flow solutions using the Johnson-King turbulent model for a typical transport configuration.

O.G.

A92-45493*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

COUPLED NUMERICAL SIMULATION OF THE EXTERNAL AND ENGINE INLET FLOWS FOR THE F-18 AT LARGE INCIDENCE

SCOTT M. MURMAN (MCAT Institute, Moffett Field, CA), YEHIA M. RIZK, and LEWIS B. SCHIFF (NASA, Ames Research Center, Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 192-200. refs (Contract NCC2-729)

(AIAA PAPER 92-2621) Copyright

This paper presents a numerical simulation of the external and engine inlet flows for the F-18 aircraft at typical high-angle-of-attack flight conditions. Two engine inlet mass flow rates, corresponding to flight idle and maximum power, were computed. This was accomplished using a structured, overset grid technique to couple the external and internal grid systems. Reynolds-averaged Navier-Stokes solutions were obtained using an implicit, finite-differencing scheme. Results show a strong coupling of the external and engine inlet flows, especially at the maximum power setting. Increasing the mass flow rate through the inlet caused the primary vortex breakdown location to move downstream. This trend is also observed in flight tests performed on the F-18. A reversed flow region upstream of the inlet duct is visible in the faired-inlet and flight-idle computations. This flow reversal is not present in the maximum power setting computation. These large-scale changes in flow structure highlight the importance of simulating inlet conditions in high-angle-of-attack aircraft computations.

A92-45494*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

EXPERIMENTAL INVESTIGATION OF THE FLOWFIELD OF AN OSCILLATING AIRFOIL

J. PANDA and K. B. M. Q. ZAMAN (NASA, Lewis Research Center, Cleveland, OH) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 201-218. refs (AIAA PAPER 92-2622) Copyright

The flow field of an airfoil oscillated periodically over a wide range of reduced frequencies, 0 less than k less than 1.6, is studied experimentally at chord Reynolds numbers of R sub c = 22,000 and 44,000. The NACA0012 airfoil is pitched sinusoidally about one quarter chord between alpha of 5 deg and 25 deg.

Detailed flow visualization and phase averaged vorticity measurements are carried out for k = 0.2 to document the evolution and the shedding of the dynamic stall vortex (DSV). In addition to the DSV, an intense vortex of opposite sign originates from the trailing edge just when the DSV is shed. After being shed into the wake, the two together take the shape of a large 'mushroom' while being convected away from the airfoil. The unsteady circulation around the airfoil and, therefore, the time varying component of the lift is estimated in a novel way from the shed vorticity flux and is found to be in good agreement with the lift variation reported by others. The delay in the shedding of the DSV with increasing k, as observed by previous researchers, is documented for the full range of k. The DSV, for example, is shed nearly at the maximum alpha of 25 deg at k = 0.2, but is shed at the minimum alpha of 5 deg at k = 0.8. At low k, the flowfield appears quasi-steady and the bluff body shedding corresponding to the maximum alpha (25 deg) dominates the unsteady fluctuations in the wake.

A92-45495# **BOUNDARY-LAYER MEASUREMENTS DURING A PARALLEL BLADE-VORTEX INTERACTION**

J. STRAUS and R. E. MAYLE (Rensselaer Polytechnic Institute, IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 219-229. refs (AIAA PAPER 92-2623) Copyright

The unsteady effect of a downstream convecting two-dimensional vortex on an airfoil boundary layer is studied experimentally. Surface pressures and boundary layer velocity profiles are measured over several critical portions of a NACA 0012 airfoil during the interaction with the vortex. Results indicated that the response of the boundary layer to the passing vortex was highly dependent upon the initial state of the boundary layer and on the spin orientation of the vortex.

A92-45496#

A FAST THREE-DIMENSIONAL VORTEX METHOD FOR **UNSTEADY WAKE CALCULATIONS**

KIAT CHUA and TODD R. QUACKENBUSH (Continuum Dynamics, Inc., Princeton, NJ) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 230-238. refs (Contract DE-FG05-91ER-81207; DAAL03-89-C-0004) (AIAA PAPER 92-2624) Copyright

This paper describes the development of a fast vortex method for the numerical simulation of a three-dimensional, unsteady, vortical flow. Previous simulations using a vortex method rely on a direct summation of the Biot-Savart induced velocity due to all vortices. This approach requires a large computation time which increases quadratically with the number of vortices. The method developed herein uses a multipole expansion and a Taylor series expansion in the treatment of the far-field induced velocity. This results in an enormous improvement in the computational speed with little or no loss in accuracy. Application of the method to a simple flow geometry involving the propagation of an isolated vortex ring, as well as a complete helicopter flow configuration, involving the unsteady wake trailing from a four-bladed rotor and draping over an axisymmetric fuselage, have been carried out and results obtained from the calculations are discussed in the paper.

Author

A92-45497#

DYNAMICALLY ENHANCED SUSTAINED LIFT USING OSCILLATING LEADING-EDGE FLAPS

BROOKE C. SMITH (Eidetics International, Inc., Torrance, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 239-250. refs

(Contract N00019-91-C-0083) (AIAA PAPER 92-2625) Copyright

Flow visualization experiments were conducted in Eidetics' water tunnel with a 1/16-scale half-span F/A-18 wing with the objective of increasing, prolonging or sustaining lift dynamically by altering the formation and development of the stall vortex using control surface movements. Oscillation of the leading-edge flap produced a dramatic, time-varying response in the flowfield that indicated the generation of additional sustained lift at a static angle of attack. The angular rate of the leading-edge oscillation was identified as the primary factor in the magnitude of lift enhancement. followed in importance by the frequency and amplitude of the oscillation. To assist interpretation of the flow visualization images. a computer model of the shed vorticity was created. The general agreement of the oscillatory wake predicted by the simulation and the wake recorded in the experiment confirmed the importance of the leading-edge flap deflection rate. A major difference between the potential flow, inviscid simulation and the real flow was the lift-indicative wake contraction. The simple model has no mechanism for predicting this behavior, leading to the conclusion that the contraction is due to higher order, viscous interactions in the flow

A92-45498# MEASUREMENTS OF THE VELOCITY AND VORTICITY FIELDS AROUND A PITCHING AIRFOIL

H. OSHIMA and B. R. RAMAPRIAN (Washington State University, Pullman) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 251-259, refs

(Contract AF-AFOSR-90-0131) (AIAA PAPER 92-2626) Copyright

This paper reports the results of measurement of the instantaneous velocity and vorticity field in the 2D flow over an NACA 0015 airfoil pitching at constant angular velocity about its quarter-chord axis. The measurements were made in a specially designed water channel using the technique of particle-image velocimetry. The data correspond to a Reynolds number of 15,000 and a nondimensional pitch rate of 0.072. The results are used to understand the vortex dynamics associated with unsteady lift generation and dynamic stall. The use of the water channel and the selection of the experimental conditions result in good spatial and temporal resolution of the flowfield. The present measurements also provide a reliable database for the development and verification of numerical codes. Author

A92-45499#

NUMERICAL STUDY ON A SUPERSONIC OPEN CAVITY FLOW WITH GEOMETRIC MODIFICATION OF AFT BULKHEAD

YIH N. JENG and TIN-JUE! WU (National Cheng Kung University, Tainan, Republic of China) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 260-267. refs (Contract NSCRC-80-0401-E006-41)

(AIAA PAPER 92-2627) Copyright

A supersonic open cavity flow is numerically simulated by a third-order up wind TVD scheme. The upper corner of the aft bulkhead of a rectangular cavity is replaced by a ramp with a variety of ramp angles. Numerical results show that a large enough ramp angle can effectively suppress the overall sound pressure level and that the optimal angle of 45 deg is consistent with existing analytical prediction. By examining the flowfields, the modification of the geometry of the cavity is found to change the mechanism inducing the mass exchange from the interaction between the oscillatory shear layer and rectangular cavity's rear corner to the fluctuation of shear layer's impinging point on the ramp surface. Subsequently, the interaction between the free shear layer, vortices and pressure waves within the cavity is reduced.

Author

A92-45500#

STATIC AND DYNAMIC FLOW FIELD DEVELOPMENT ABOUT A POROUS SUCTION SURFACE WING

GREGORY A. ADDINGTON (USAF, Wright Laboratory, Wright-Patterson AFB, OH), SCOTT J. SCHRECK (USAF, Frank J. Seiler Research Laboratory, Colorado Springs, CO), and MARVIN W. LUTTGES (Colorado, University, Boulder) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 268-284. refs (Contract F49620-90-C-0076)

(AIAA PAPER 92-2628)

A passive suction surface was fit to a hollow NACA 0015 wing of otherwise conventional construction. No active forcing was applied to this surface. Static surface pressure measurements indicated that the adverse pressure gradient usually present over the aft portions of this wing was severely attenuated by the addition of the porous surface, and Cp values were generally lower than those experienced by the nonporous surface wing. When these pressure data were combined with flow visualization data, a separated region ornamented with periodic vortical structures became apparent. Using flow visualization and surface pressure measurements taken during constant-rate pitch motions of the porous wing, no evidence of dynamic stall phenomena were observed at low nondimensional pitch rates during circumstances when dynamic stall phenomena are otherwise evident. As nondimensional pitch rates were increased, dynamic stall vortices were observed over the porous surface, but this and other dynamic stall flowfield developments were dramatically altered by surface conditions. A physical model is produced explaining these phenomena.

A92-45502*# National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
COMPUTATIONAL STUDY OF TRANSITION FRONT ON A
SWEPT WING LEADING-EDGE MODEL

VENKIT IYER (Vigyan, Inc., Hampton, VA), ROBERT E. SPALL (South Alabama, University, Mobile, AL), and J. R. DAGENHART (NASA, Langley Research Center, Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 304-314. Research supported by University of South Alabama. refs (Contract NAS1-18585)

(AIAA PAPER 92-2630)

The e(N) method is employed with Navier-Stokes calculations to study 3D supersonic boundary layers at the leading-edge region of swept wings with attention given to the conditions for linear stability. Mean-flow profiles are computed as solutions to the Navier-Stokes equations, and the e(N) method is used to identify the onset of the transition. Specific treatment is given to the identification of parameters which affect the transition such as free-stream Reynolds number, wall cooling, and boundary-layer suction levels. The boundary layer can be stabilized to below $N\!=\!10$ levels in all locations by utilizing distributed suction, and enhanced stabilization can also be achieved by employing wall cooling and reduced free-stream Reynolds numbers. This study presents key calculations for corresponding experimental investigations by shedding light on requirements for test conditions and measurement requirements.

A92-45503#

AIRFOIL PRESSURE MEASUREMENTS DURING OBLIQUE SHOCK WAVE-VORTEX INTERACTION IN A MACH 3 STREAM IRAJ M. KALKHORAN and PASQUALE M. SFORZA (Polytechnic University, Farmingdale, NY) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 315-321. refs (AIAA PAPER 92-2631) Copyright

An experimental investigation of the interaction of discrete vortices with oblique shock waves was conducted in a Mach 3 blowdown wind tunnel. An instrumented two-dimensional wedge

airfoil section was placed downstream of a semi-span wing section so that the trailing tip vortex would interact with the shock wave formed over the downstream test airfoil. The experiments were designed to simulate interaction of streamwise vortices from upstream sections with shock waves formed over aft surfaces as might be encountered in supersonic flight of aircraft and missiles. The influence of vortex strength and vortex-airfoil vertical separation distance on the interaction was examined. The flowfield generated was found to be highly unsteady and a substantial change in the pressure distribution of the downstream airfoil was observed. Furthermore, the interaction of strong vortices with the oblique shock waves over the test airfoil resulted in formation of unsteady detached shock waves far upstream of the airfoil leading edge.

Author

A92-45504#

UNSTEADY NAVIER-STOKES SIMULATIONS OF SUPERSONIC FLOW OVER A THREE-DIMENSIONAL CAVITY

YEN TU (USAF, Wright Laboratory, Eglin AFB, FL) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 322-329. refs (AIAA PAPER 92-2632)

A numerical solution is obtained for a flow with a freestream Mach number of 1.2 and Reynolds number of 2.5 x 10 exp 6 over a three-dimensional cavity with an L/D of 4.5. This is accomplished by integrating the unsteady compressible 3D Reynolds averaged Navier-Stokes equations. Turbulence is modeled via a simple algebraic model. Self-sustained oscillatory motion within the cavity has been observed. Details of the flow field are elucidated in terms of velocity vectors and pressure contours. Calculated results agree well with experimental data.

Autho

A92-45505*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PRACTICAL DESIGN OPTIMIZATION OF WING/BODY CONFIGURATIONS USING THE EULER EQUATIONS

J. REUTHER, S. E. CLIFF, R. M. HICKS (NASA, Ames Research Center, Moffett Field, CA), and C. P. VAN DAM (California, University, Davis) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 330-342. refs (AIAA PAPER 92-2633)

The development of a practical method for the aerodynamic design of isolated wing and wing/body configurations is achieved through the coupling of existing computational fluid dynamics (CFD) analysis codes and a quasi-Newton numerical optimization method. The direct design method is generalized to treat three-dimensional aerodynamic optimization problems subject to inviscid, rotational, compressible flow conditions imposed by the Euler equations. The method couples either the FLO57 or the TEAM flow solver with a modified version of the QNMDIF numerical optimization algorithm. The method is applied, but is not limited, to supersonic design problems. A case study is presented illustrating the method's effectiveness in maximizing the lift-to-drag ratio, subject to a variety of constraints, of selected supersonic configurations at cruise conditions.

A92-45506#

AERODYNAMIC SHAPE OPTIMIZATION OF HYPERSONIC CONFIGURATIONS INCLUDING VISCOUS EFFECTS

GEORGE S. DULIKRAVICH and SCOTT G. SHEFFER (Pennsylvania State University, University Park) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 343-351. Research supported by Pennsylvania State University. refs (AIAA PAPER 92-2635) Copyright

An optimization algorithm is introduced which can be used to study nonaxisymmetric hypersonic configurations in terms of combined aerodynamic wave drag and viscous drag minimization.

Modified Newtonian flow theory and modified boundary-layer approximations are used in the algorithm, and a surface-fitted Fourier series or a point-motion algorithm is used for the shape optimization. The optimal configuration is then determined with a quasi-Newton gradient search for cone, stubby-wing, four-pointed-star, and space-shuttle configurations. The point-motion algorithm is used to fix parameters of the original aircraft such as wing thickness and cabin size, and the coefficient algorithm permits the derivation of optimized shapes for the hypersonic vehicles. C.C.S.

A92-45507#

APPLICATION OF AN UNSTRUCTURED NAVIER-STOKES SOLVER TO MULTI-ELEMENT AIRFOILS OPERATING AT TRANSONIC MANEUVER CONDITIONS

LUCA STOLCIS and LESLIE J. JOHNSTON (University of Manchester Institute of Science and Technology, England) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 352-360. refs (AIAA PAPER 92-2638) Copyright

The development of a numerical prediction method for the viscous transonic flow around multielement, high-lift aerofoil sections is summarized. The method involves solution of the Reynolds-averaged Navier-Stokes equations using a cell-centered, finite-volume spatial discretization and an explicit multistage scheme to time march to steady-state solutions. The mean-flow equations are solved in conjunction with a two-equation, high-Reynolds number k-epsilon turbulence model, in order to deal adequately with the complex flow physics. The geometric complexity associated with multielement aerofoils is addressed by adopting unstructured computational grids. In this way, fully representative geometries can be handled including blunt trailing edges and sharp-edged cut-outs in flap and slat cove regions. A detailed evaluation is presented of the predictive capability of the resulting method for the SKF 1.1 aerofoil/maneuver flap configuration.

A92-45508*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

VORTEX TRAPPING ON A 60 DEGREE DELTA WING

MARK D. BUCHHOLZ and JIN TSO (California Polytechnic State University, San Luis Obispo) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 361-373. refs (Contract NCC2-730)

(AIAA PAPER 92-2639) Copyright

An experiment was conducted to examine the vortex trapping concept on a 60 deg sweep delta wing at low angles of attack. Using tapered leading edge fences, stable vortices have been successfully trapped. The resulting increase in lift coefficient can be as high as 0.4, which amounts to a 6.5 deg shift in the lift coefficient curve of the delta wing. The corresponding increase in drag coefficient, however, is also significant.

A92-45509#

AIRCRAFT SPOILER EFFECTS UNDER WIND SHEAR

M. M. ABDELRAHMAN, M. A. GHAZI, I. A. OLWI, and A. M. AL-BAHI (King Abdulaziz University, Jedda, Saudi Arabia) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 391-401. refs (AIAA PAPER 92-2642) Copyright

Effects of symmetrical and nonsymmetrical spoiler configurations on an aircraft model under wind shear are experimentally studied. Lift, drag and side forces in addition to pitching, yawing and rolling moments are investigated for various angles of attack, sideslip angles, spoiler deflections and wind shear velocity ratios. The results substantiate that spoiler deflection increases the drastic lift reduction caused by wind shear effect, specially at low angles of attack. Wind shear also tends to intensify the spoiler effect on the side force and yawing moment, while it

affects the resulting rolling moment only at high angles of attack. Spoiler deflections, however, have practically no effect on the aircraft stability margin which normally increases by the presence of wind shear.

Author

A92-45510*# National Aeronautics and Space Administration, Washington, DC.

A NONLINEAR RELAXATION/QUASI-NEWTON ALGORITHM FOR THE COMPRESSIBLE NAVIER-STOKES EQUATIONS

JACK R. EDWARDS and D. S. MCRAE (North Carolina State University, Raleigh) IN: AlAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 402-409. Research supported by USAF and U.S. Navy. refs

(Contract NAGW-1072)

(AIAA PAPER 92-2643) Copyright

A highly efficient implicit method for the computation of steady, two-dimensional compressible Navier-Stokes flowfields presented. The discretization of the governing equations is hybrid in nature, with flux-vector splitting utilized in the streamwise direction and central differences with flux-limited artificial dissipation used for the transverse fluxes. Line Jacobi relaxation is used to provide a suitable initial guess for a new nonlinear iteration strategy based on line Gauss-Seidel sweeps. The applicability of quasi-Newton methods as convergence accelerators for this and other line relaxation algorithms is discussed, and efficient implementations of such techniques are presented. Convergence histories and comparisons with experimental data are presented for supersonic flow over a flat plate and for several high-speed compression corner interactions. Results indicate a marked improvement in computational efficiency over more conventional upwind relaxation strategies, particularly for flowfields containing large pockets of streamwise subsonic flow.

A92-45513#

SHOCK FITTING WITH A FINITE VOLUME APPROXIMATION TO THE EULER EQUATIONS

SCOTT A. SIBIO (Princeton University, NJ) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 424-432. refs (AIAA PAPER 92-2646) Copyright

A shock fitting algorithm for use with a finite volume approximation to the Euler equations is presented. The scheme allows the shock wave to cross both families of grid lines in the structured computational grid. Results are shown for various flows over a wedge.

Author

A92-45514#

PREDICTIONS OF A TURBULENT BACKWARD-FACING-STEP FLOW WITH A CUBIC PRESSURE-STRAIN MODEL

C. A. LIN (National Tsing Hua University, Hsinchu, Republic of China) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 433-440. refs

(AIAA PAPER 92-2647) Copyright

Three variants of a cubic pressure-strainstress model were applied to a 2D turbulent backward-facing-step flow, and the results were contrasted with the measurements and the predictions by the k-epsilon model and a linear pressure-strain IP stress model. It was found that the inclusion of the turbulence part of the wall-related pressure-strain term in the cubic model would result in a depressed level of shear stresses due to the over-damping of the normal stresses in the direction normal to the wall and consequently an elongation of the predicted reattachment length. The cubic models without the turbulence part of the wall related pressure-strain process were shown to predict a better anisotropic-level of stresses. Overall, one version of the cubic pressure-strain model with a modified epsilon source returns best regarding the reattachment length and the recovery region after the reattachment point.

A92-45515#

LAMINAR SEPARATION BUBBLES AND AIRFOIL DESIGN AT LOW REYNOLDS NUMBERS

R. H. LIEBECK (Douglas Aircraft Co., Long Beach; Southern California, University, Los Angeles, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 441-456. refs (AIAA PAPER 92-2735) Copyright

Airfoil design at low Reynolds numbers is distinguished by the requirement that the omnipresent laminar separation bubble needs to be understood. Recently, an experimental investigation on the structure and behavior of the bubble on low Reynolds number airfoils was conducted in the University of Southern California Dryden low turbulence wind tunnel. Significant results include: the laminar portion of the bubble structure is two-dimensional, simple sweep theory describes bubble behavior on infinite swept wings, and the dynamics of the bubble are independent of airfoil shape, angle of attack, and Reynolds number. Application of these results to the design and analysis of low Reynolds number airfoils appears promising. The airfoil design approach at the Douglas Aircraft Company is outlined, and several example low Reynolds number airfoils for a variety of applications are presented.

A92-45516#

THE SUBSONIC AND TRANSONIC FLOW AROUND THE LEADING EDGE OF A THIN AIRFOIL WITH A PARABOLIC NOSE

Z. RUSAK and B. E. WEBSTER (Rensselaer Polytechnic Institute, Troy, NY) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 457-463. refs (AIAA PAPER 92-2649) Copyright

This paper discusses recent asymptotic solutions of the subsonic and transonic flow around the leading edge of a thin airfoil with a parabolic nose. The analyses show that in the subsonic regime the flowfield near the nose is strongly affected by the total circulation around the airfoil, whereas in the transonic regime, it is locally symmetric and dominated by the local shape of the parabolic nose. A possible physical mechanism is suggested to explain the basic differences between the flows in the nose region. A good agreement is found between the asymptotic solutions and refined numerical solutions of the Euler equations. The calculations confirm the analyses prediction abouat the shift of the stagnation point toward the airfoil's leading edge as the Mach number of the oncoming flow is increased from subsonic to transonic.

A92-45517*# National Aeronautics and Space Administration, Washington, DC.

MULTI-POINT INVERSE DESIGN OF AN INFINITE CASCADE OF AIRFOILS

MICHAEL S. SELIG (Pennsylvania State University, University Park) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 464-476. refs

(Contract NGT-50341)

(AIAA PAPER 92-2650) Copyright

This paper describes a practical method for the design of an infinite cascade in incompressible flow. The method is based on conformal mapping, and as a result it allows for multi-point design. The cascade blade to be determined is divided into a desired number of segments. Over each segment, the velocity distribution is prescribed together with an inlet or outlet flow angle at which this velocity distribution is to be achieved. In this way multi-point design requirements can be met. It is necessary to satisfy several conditions that arise to guarantee compatibility with the inlet and outlet flow as well as closure of the cascade blade. Satisfaction of these conditions does not necessarily result in a cascade with all the desired characteristics. For example, the cascade blades may be bulbous or crossed. Through Newton iteration, however, the desired characteristics may be prescribed by allowing for the

adjustment of the design parameters that define the mathematical problem through conformal mapping. Several examples will be illustrated to demonstrate the capability of the method. It will be shown that the method is limited to the design of cascades with solidities of up to one.

Author

A92-45518*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

TRANSONIC AIRFOIL AND WING DESIGN USING NAVIER-STOKES CODES

N. J. YU (Boeing Commercial Airplane Group, Seattle, WA) and R. L. CAMPBELL (NASA, Langley Research Center, Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 477-485. refs

(AIAA PAPER 92-2651) Copyright

An iterative design method has been implemented into 2D and 3D Navier-Stokes codes for the design of airfoils or wings with given target pressure distributions. The method begins with the analysis of an initial geometry, and obtains the analysis pressure distributions of that geometry. The differences between analysis pressures and target pressures are used to drive geometry changes through the use of a streamline curvature method. This paper describes the procedure that makes the iterative design method work for Navier-Stokes codes. Examples of 2D airfoil design, and 3D wing design are included. It is demonstrated that the method is highly effective for airfoil or wing design at flow conditions where no substantial separation occurs. Problems encountered in the airfoil design with shock induced flow separations are discussed.

Autho

A92-45520#

EFFECT OF THROAT CONTOURING ON TWO-DIMENSIONAL CONVERGING-DIVERGING NOZZLES USING URS METHOD

GE-CHENG ZHA and E. BILGEN (Ecole Polytechnique, Montreal, Canada) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 494-502. refs

(AIAA PAPER 92-2659) Copyright

Numerical calculations have been conducted to study the nozzle internal-performance effect of throat contouring, the result of increasing the circular-arc throat radius. Five nonaxisymmetric converging-diverging nozzles at design conditions were calculated by solving the three-dimensional Navier-Stokes equations using Upwind Relaxation-Sweeping (URS) algorithm. Throat contouring resulted in a positive effect on discharge coefficient but showed no significant improvement in internal thrust ratio. All the computational results have been compared with the experiments and they are generally in good agreement.

A92-45522#

INVESTIGATION OF SOLUTION OPERATORS FOR THE THREE-DIMENSIONAL EULER EQUATIONS

FRANK A. MANSFIELD (U.S. Navy, Naval Air Warfare Center, China Lake, CA) and DAVID WHITFIELD (Mississippi State University, Mississippi State) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 507-517. refs (AIAA PAPER 92-2666) Copyright

Various combinations of the implicit left-hand side and explicit right-hand side operators are investigated in terms of stability bounds and convergence rates for subsonic, transonic, and supersonic flows. A method for numerically analyzing the stability of any numerical solution operator based on finite difference or finite-volume formulations for the 3D inviscid Euler equations is used. Three different block solvers - tridiagonal, two-pass, and modified two-pass - are also evaluated. The modified two-pass solver is shown to be the best in terms of stability, convergence, and CPU time. The effects on stability and convergence of different

components, such as flux Jacobian formulation and factorization, used in creating a solution equation operator for Euler equations are clearly established.

C.A.B.

A92-45523#

AN UNFACTORED IMPLICIT SCHEME FOR 3D INVISCID TRANSONIC FLOWS

STEFANO PAOLETTI, MARCELLO VITALETTI (IBM European Center for Scientific and Engineering Computing, Rome, Italy), and PETER STOW (Rolls-Royce, PLC, Dept. of Theoretical Science, Derby, England) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 518-527. refs (AIAA PAPER 92-2668) Copyright

An unfactored implicit scheme for the 3D Euler equations is compared with the alternating-direction-implicit (ADI) scheme. Emphasis is on the effect of the factorization error on the convergence to a steady-state solution. The unfactored scheme can achieve a faster convergence by the exploitation of larger time-steps but requires the solution of large sparse systems of equations. The conjugate-gradient-squared iterative algorithm is applied to the unfactored system using the ADI product of block-tridiagonal factors as a preconditioner, and the method was tested on transonic and subsonic test cases.

A92-45524# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A NEW APPROACH FOR THE CALCULATION OF TRANSITIONAL FLOWS

T. W. YOUNG, ERIC S. WARREN (North Carolina State University, Raleigh), JULIUS E. HARRIS (NASA, Langley Research Center, Hampton, VA), and H. A. HASSAN (North Carolina State University, Raleigh) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 528-538. Research supported by USAF and U.S. Navy. refs (Contract NCC1-22; NAGW-1022; NAGW-1331) (AIAA PAPER 92-2669) Copyright

In spite of many attempts at modeling natural transition, it has not been possible to predict the streamwise intensities. A procedure is developed which incorporates some results of linear stability theory into one-equation and stress model formulations. The stresses resulting from fluctuations in the transitional region have turbulent, laminar (nonturbulent) and large eddy components. Comparison with Schubauer and Klebanoff's experiments have shown that the nonturbulent and large eddy components have a large influence on the streamwise intensities and little influence on the shear stress. Finally, predictions of the one-equation model were as good as those obtained by the stress model.

A92-45525*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DETERMINATION OF AERODYNAMIC SENSITIVITY COEFFICIENTS BASED ON THE THREE-DIMENSIONAL FULL POTENTIAL EQUATION

HESHAM M. ELBANNA and LELAND A. CARLSON (Texas A & M University, College Station) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 539-548. refs (Contract NAG1-793)

(AIAA PAPER 92-2670) Copyright

The quasi-analytical approach is applied to the three-dimensional full potential equation to compute wing aerodynamic sensitivity coefficients in the transonic regime. Symbolic manipulation is used to reduce the effort associated with obtaining the sensitivity equations, and the large sensitivity system is solved using 'state of the art' routines. Results are compared to those obtained by the direct finite difference approach and both methods are evaluated to determine their computational accuracy and efficiency. The quasi-analytical approach is shown

to be accurate and efficient for large aerodynamic systems.

Author

A92-45526#

LU-SGS IMPLICIT SCHEME FOR ENTRY VEHICLE FLOW COMPUTATION AND COMPARISON WITH AERODYNAMIC DATA

L. T. TAM (Lockheed Engineering and Sciences Co., Houston, TX) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 549-562. refs

(AIAA PAPER 92-2671) Copyright

A three-dimensional shock-capturing CFD code, IEC3D, has been developed for hypersonic flow computations. An upwind-biased, finite-volume, high-order TVD scheme based on Van Leer MUSCL type flux-vector splitting and Roe characteristic-based flux-difference splitting has been incorporated into the code. The LU-SGS implicit solver originally developed by Jameson and Yoon is considered. Computed pressure distributions, aerodynamic coefficients, shock shapes, and flowfields for both perfect gas and equilibrium gas are compared with available data for three aerospace vehicles at wind tunnel and flight conditions. Satisfactory agreement is noted between the CFD results and the measurements in all cases considered.

A92-45528*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

NUMERICAL INVESTIGATION OF TAIL BUFFET ON F-18 AIRCRAFT

YEHIA M. RIZK, GURU P. GURUSWAMY (NASA, Ames Research Center, Moffett Field, CA), and KEN GEE (MCAT Institute, Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 573-587. refs (AIAA PAPER 92-2673) Copyright

Numerical investigation of vortex induced tail buffet is conducted on the F-18 aircraft at high angles of attack. The Reynolds-averaged Navier-Stokes equations are integrated using a time-accurate, implicit procedure. A generalized overset zonal grid scheme is used to decompose the computational space around the complete aircraft with faired-over inlet. A weak coupling between the aerodynamics and structures is assumed to compute the structural oscillation of the flexible vertical tail. Time-accurate computations of the turbulent flow around the F-18 aircraft at 30 degrees angle of attack show the surface and off-surface flowfield details, including the unsteadiness created by the vortex burst and its interaction with the vertical twin tail which causes the tail buffet. The effect of installing a LEX fence on modifying the vortex structure upstream of the tail is also examined.

A92-45529#

UNSTEADY PRESSURE AND LOAD MEASUREMENTS ON AN F/A-18 VERTICAL FIN AT HIGH-ANGLE-OF-ATTACK

B. H. K. LEE and F. C. TANG (National Research Council of Canada, Institute for Aerospace Research, Ottawa) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 588-599. Research supported by National Research Council of Canada and DND. refs

(AIAA PAPER 92-2675) Copyright

Tail buffet on a rigid 6-percent scale model of the F/A-18 was investigated in a 1.5 m trisonic blowdown wind tunnel. Strain gauges were installed on the port fin to measure normal-force, root-bending, and torsion moments. The starboard fin was instrumented with 24 fast-response transducers on each surface for unsteady pressure measurements. Static tests at constant angle of attack were performed to compare the loads and moments from the strain-gauged fin with those determined from pressure measurements. The mean angle of attack, amplitude of oscillation, and Mach number were varied to note the effects of delay in LEX

vortex burst on the vertical-fin buffet loads. The envelopes of the unsteady force and pressure signals, rms variations with angle of attack, and probability densities were evaluated to study the normal force and pressures fluctuations on the vertical fin.

A92-45530*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

ANALYSIS OF A PNEUMATIC FOREBODY FLOW CONTROL CONCEPT ABOUT A FULL AIRCRAFT GEOMETRY

KEN GEE (MCAT Institute, Moffett Field, CA), YEHIA M. RIZK (NASA, Ames Research Center, Moffett Field, CA), SCOTT M. MURMAN (MCAT Institute, Moffett Field, CA), WENDY R. LANSER, LARRY A. MEYN, and LEWIS B. SCHIFF (NASA, Ames Research Center, Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 600-613. refs (AIAA PAPER 92-2678) Copyright

A full aircraft geometry is used to computationally analyze the effectiveness of a pneumatic forebody flow control concept. An overset grid technique is employed to model the aircraft and slot geometry. Steady-state solutions for both isolated forebody and full aircraft configurations are carried out using a thin-layer Navier-Stokes flow solver. A solution obtained using the full aircraft geometry and a flight sideslip condition investigates the effect of sideslip on the leading edge extention vortex burst point. A no-sideslip blowing solution using the isolated forebody at full-scale wind tunnel test conditions is compared with experimental data to determine the accuracy of the numerical method. A solution employing the full geometry and slot blowing at flight conditions is obtained.

A92-45531#

CALCULATION OF HIGH SPEED BASE FLOWS

R. H. NICHOLS, J. R. MAUS, R. L. SPINETTI (Calspan Corp., Arnold AFB, TN), and G. A. MOLVIK (MCAT Corp., Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 614-623. refs

(AIAA PAPER 92-2679)

A computational approach for high-speed base flows of reentry shapes is demonstrated. The approach is based on solving the thin-layer Navier-Stokes equations for perfect gas, equilibrium air, or chemical nonequilibrium air. An efficient space-marching algorithm is used whenever possible on the body and in the far wake. A blocked time-marching algorithm is used to calculate the embedded subsonic flow in the base region. A two-equation turbulence model which includes compressibility effects is used to extend the approach to Reynolds numbers above the transition to turbulent flow. Comparisons with data are made for both laminar and turbulent base flows, with good agreement in all cases.

Author

A92-45532#

SCALE EFFECTS ON THE FLOW PAST THE MATED SPACE SHUTTLE CONFIGURATION

S. V. RAMAKRISHNAN, C. L. CHEN (Rockwell International Science Center, Thousand Oaks, CA), and D. F. DOMINIK (Rockwell International Corp., Space Systems Div., Downey, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 624-632. refs

(AIAA PAPER 92-2680) Copyright

Computation of scale effects for the case of the flow past the mated Space Shuttle configuration in ascent mode is presented. The grid employed in the calculations has enough resolution to bring out some of the global features of the differences in the flow field between the full-scale model and a 3-percent wing-tunnel model. A finer grid is required to capture local details. At the wind-tunnel Reynolds number the surface-pressure distribution is

smoother and the effect of the protuberances travel farther upstream as compared to the flight Reynolds number. Author

A92-45534*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AN ADAPTIVE GRID METHOD FOR COMPUTING THE HIGH SPEED 3D VISCOUS FLOW ABOUT A RE-ENTRY VEHICLE

MICHAEL J. BOCKELIE (Computer Sciences Corp., Hampton, VA) and ROBERT E. SMITH (NASA, Langley Research Center, Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 641-650. refs (AIAA PAPER 92-2685)

An algebraic solution adaptive grid generation method that allows adapting the grid in all three coordinate directions is presented. Techniques are described that maintain the integrity of the original vehicle definition for grid point movement on the vehicle surface and that avoid grid cross over in the boundary layer portion of the grid lying next to the vehicle surface. The adaptive method is tested by computing the Mach 6 hypersonic three dimensional viscous flow about a proposed Martian entry vehicle.

Author

A92-45535#

EXPERIMENTAL DEVELOPMENT OF SPANWISE VORTEX MODELS WITH STREAMWISE DECAY DUE TO WALL INTERACTION

MICHAEL MACRORIE and WAYNE R. PAULEY (Pennsylvania State University, University Park) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 651-660. refs (Contract N00014-89-J-3102)

(AIAA PAPER 92-2688) Copyright

Results of an experimental investigation of the interaction between convecting 2D spanwise vortex structures and a flat plate are presented to provide modeling of convected 2D vortices developing in close interaction with a surface. Vortices of both positive and negative circulation are studied at four generator heights above the test surface. The strength of the vortices is not strongly affected by the interaction with the surface until the vortex core becomes fully embedded in the boundary layer. The streamwise decay of vortices of both sense are studied for a single generator height at five streamwise stations. The core vorticity of the dynamic stall vortices experience an initial decay rate of t exp-1 which is similar to that predicted for an Oseen vortex. Three-dimensional effects should be small in this experiment and do not contribute substantially to the vortex decay.

A92-45536#

LDV MEASUREMENTS IN THE THREE-DIMENSIONAL NEAR WAKE OF A STATIONARY AND OSCILLATING RECTANGULAR WIND

Y. ZHENG and B. R. RAMAPRIAN (Washington State University, Pullman) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 661-671. refs

(Contract DAAL03-87-G-0011)

(AIAA PAPER 92-2689) Copyright

The structure of the 3D flow in the near wake of a NACA 0015 rectangular wing of semiaspect ratio 2 was studied in detail using three-component laser-Doppler velocimetry. Two cases were investigated: stationary wing and wing sinusoidally oscillating in pitch about its c/4 axis. The data obtained include time-mean (in steady flow) and phase-locked (in unsteady flow) properties such as velocity and vorticity. These data show clearly that in the near wake, the quasi-two-dimensional shear layer in the inboard regions of the wake, carrying spanwise vorticity, travels toward the tip where it rolls up into the tip vortex carrying strong axial vorticity. The data are useful in understanding the process of roll-up of the vortex in the near wake.

A92-45537*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LDV MEASUREMENTS ON A RECTANGULAR WING WITH A SIMULATED GLAZE ICE ACCRETION

A. KHODADOUST, M. B. BRAGG, and M. KERHO (Illinois, University, Urbana) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 672-687. Research supported by NASA. refs

(AIAA PAPER 92-2690) Copyright

LDV measurement results are presented for the upper surface of a rectangular semispan wing with and without simulated glaze ice accretion. Inspection of the model centerline flow field indicates that a large region of reverse flow exists aft of the ice horn on the iced model. At alpha = 0 deg, this region extends to 7 percent chord, while at alpha = 4 deg the bubble grows to more than 12 percent chord. At alpha = 8 deg, the time-averaged separation bubble is measured well beyond 50 percent chord. Experimental and computational flow visualization support these findings. The flow in the vicinity of the ice shape contains many of the features of flow over a backward-facing step.

A92-45538#

COMPARISON OF INTERFEROMETRIC MEASUREMENTS WITH 3-D EULER COMPUTATIONS FOR CIRCULAR CONES IN SUPERSONIC FLOW

T. A. W. M. LANEN and E. M. HOUTMAN (Delft University of Technology, Netherlands) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 688-698. refs (AIAA PAPER 92-2691) Copyright

Dual-reference-beam, plane-wave digital holographic interferometry has been applied to obtain quantitative interferometric data in the 3D supersonic flow over circular cones. The interferometric data is compared on a 2D grid with the postprocessed results from an Euler code which simulates 3D inviscid compressible flows. The comparison involves two different combinations of cone angle and angle of incidence. The maximum deviations between the interferometric data and the numerical data confine themselves to the interval 2.0, + 2.0 percent.

A92-45539*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

LDA MEASUREMENTS IN A MACH 2 FLOW OVER A REARWARD FACING STEP WITH STAGED TRANSVERSE INJECTION

J.-A. WANG and C. L. DANCEY (Virginia Polytechnic Institute and State University, Blacksburg) IN: AlAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 699-704. refs (Contract NAS1-18471)

(AIAA PAPER 92-2692) Copyright

Measurements of the mean velocity field and selected turbulence statistics have been obtained via 2D LDA in a Mach 2 flow over a rearward facing step with downstream transverse injection. Axial mean velocity profiles, profiles of the axial and normal RMS levels, and the correlation coefficient between the axial and normal fluctuating components are presented for locations upstream of the step. These data, through comparison with other reported measurements in zero pressure gradient compressible boundary layers indicate that the boundary layers upstream of the step are consistent with 'quasi-equilibrium' turbulent boundary layers with the adiabatic wall boundary condition. Mean velocity field measurements on the symmetry plane of the tunnel are compared to laser induced iodine fluorescence measurements reported in the literature and obtained in the same facility. This comparison demonstrates the quality of the present LDA data set and shows that particle lag is not significant in the LDA measurements despite the complex nature of the downstream Author flow.

A92-45540*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SPATIAL AND TEMPORAL ADAPTIVE PROCEDURES FOR THE UNSTEADY AERODYNAMIC ANALYSIS OF AIRFOILS USING UNSTRUCTURED MESHES

JOHN R. HOOKER (Purdue University, West Lafayette, IN), JOHN T. BATINA (NASA, Langley Research Center, Hampton, VA), and MARC H. WILLIAMS (Purdue University, West Lafayette, IN) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 705-718. refs (Contract NAG1-372)

(AIAA PAPER 92-2694) Copyright

An algorithm which combines spatial and temporal adaption for the time integration of the two-dimensional Euler equations on unstructured meshes of triangles is presented. Spatial adaption involves mesh enrichment to add elements in high gradient regions of the flow and mesh coarsening to remove elements where they are no longer needed. Temporal adaption is a time accurate, local time stepping procedure which integrates the flow equations in each cell according to the local numerical stability constraint. The flow solver utilizes a four-stage Runge-Kutta time integration scheme with an upwind flux-split spatial discretization. Results obtained using spatial and temporal adaption indicate that highly accurate solutions can be obtained with a significant savings of computing time over global time stepping.

A92-45541*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

NAVIER-STOKES ANALYSIS AND EXPERIMENTAL DATA COMPARISON OF COMPRESSIBLE FLOW IN A DIFFUSING S-DUCT

GARY J. HARLOFF (Sverdrup Technology, Inc., Brook Park, OH), BRUCE A. REICHERT (NASA, Lewis Research Center, Cleveland, OH), and STEVEN R. WELLBORN (Iowa State University of Science and Technology, Ames) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 719-727. refs (Contract NAS3-25266)

(AIAA PAPER 92-2699) Copyright

Full three-dimensional Navier-Stokes computational results are compared with new experimental measurements for the flowfield within a round diffusing S-duct. The present study extends previous computational and experimental results for a similar smaller scale S-duct. Predicted results are compared with the experimental static and total pressure fields, and velocity vectors. Additionally, wall pressures, velocity profiles in wall coordinates, and skin friction values are presented. The CFD results employ algebraic and k-epsilon turbulence models. The CFD computed and experimentally determined separated flowfield is carefully examined.

A92-45542*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

DESIGN AND ANALYSIS OF VORTEX GENERATORS ON REENGINED BOEING 727-100QF CENTER INLET S-DUCT BY A REDUCED NAVIER-STOKES CODE

PAO S. HUANG, ANTONIO PICCOLO, ANDY SLATER (Dee Howard Co., San Antonio, TX), and BERNHARD H. ANDERSON (NASA, Lewis Research Center, Cleveland, OH) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 728-735. refs (AIAA PAPER 92-2700) Copyright

This paper describes the application of a three dimensional reduced Navier-Stokes code to perform design and analysis of vortex generators on a reengined Boeing 727-100QF center engine inlet S duct. This computer code with vortex generators modeling is shown to be cost-effective, accurate and easy to use to design the optimal vortex generators installed on a S-duct, predict its aerodynamic performance and provide the detailed flow field information.

Author

A92-45543*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

COMMERCIAL TURBOFAN ENGINE EXHAUST NOZZLE FLOW ANALYSES USING PAB3D

KHALED S. ABDOL-HAMID (Analytical Services and Materials, Inc., Hampton, VA), K. UENISH! (GE Aircraft Engines, Cincinnati, OH), JOHN R. CARLSON (NASA, Langley Research Center, Hampton, VA), and B. D. KEITH (GE Aircraft Engines, Cincinnati, OH) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 736-745. refs (AIAA PAPER 92-2701) Copyright

Recent developments of a three-dimensional (PAB3D) code have paved the way for a computational investigation of complex aircraft aerodynamic components. The PAB3D code was developed for solving the simplified Reynolds Averaged Navier-Stokes equations in a three-dimensional multiblock/multizone structure mesh domain. The present analysis was applied to commercial turbofan exhaust flow systems. Solution sensitivity to grid density is presented. Laminar flow solutions were developed for all grids and two-equation k-epsilon solutions were developed for selected grids. Static pressure distributions, mass flow and thrust quantities were calculated for on-design engine operating conditions. Good agreement between predicted surface static pressures and experimental data was observed at different locations. Mass flow was predicted within 0.2 percent of experimental data. Thrust forces were typically within 0.4 percent of experimental data.

A92-45544# PREDICTION OF LAMINAR BOUNDARY LAYER USING CUBIC SPLINES

A. ILINCA and B. S. BASU (Ecole Polytechnique, Montreal, Canada) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 746-752. refs

(AIAA PAPER 92-2702) Copyright

The paper presents a numerical method developed for the computation of laminar boundary layer using cubic spline interpolation in direction normal to the wall and finite difference discretization in direction parallel to the wall. A higher order accuracy is obtained not only for the velocity, but also for their first and second derivatives in normal direction, as required by the boundary layer stability analysis. A comparison with results of similar boundary layer profiles is presented.

A92-45545#

VORTEX-IN-CELL ANALYSIS OF WING WAKE ROLL-UP

RENATO S. RIBEIRO and ILAN KROO (Stanford University, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 753-763. refs

(AIAA PAPER 92-2703) Copyright

A vortex-in-cell method was coupled with a wing vortex-lattice model to compute steady-state wake roll-up. The vorticity concentrated on the wing and wake vortex-segments is distributed to a Cartesian grid through the application of a spreading function. A subvortex technique is introduced to refine the wake description without altering the number of wing panels. The velocity field induced by the spread vorticity is computed using an infinite domain Fast Poisson Solver. Interpolation provides velocities at any point inside the grid. The vortex-in-cell method is used to compute velocities for a wake relaxation procedure and to correct wing panel circulations. The iterative method developed can be applied to configurations with several wings. The method was tested for various one and two-wing problems, and compared with results from experiments and from other theories, with very good agreement. Detailed descriptions for wake geometry and accurate load distributions were obtained, even for cases where wakes intercepted wings directly.

A92-45546#

TRANSONIC UNSTEADY INVISCID AND VISCOUS FLOW'S SIMULATION AROUND 2-D MOVING BODIES

M. P. THOMADAKIS and S. TSANGARIS (Athens, National Technical University, Greece) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 764-774. refs (AIAA PAPER 92-2704) Copyright

The paper presents a generalized method for the numerical simulation of the unsteady compressible flow around stationary or moving bodies. The unsteady Euler and Reynolds-averaged Navier-Stokes equations are numerically solved using a first or second order time accurate implicit factored scheme. The aim is to investigate the effect that the higher order time accuracy has on the solution, to compare the inviscid and viscous results for the same flow problem and to investigate the influence of the grid refinement on the numerical prediction. It is shown that when a second order time accurate scheme is implemented instead of a first order one, larger time steps can be used and so computer time savings of up to 50 percent can be obtained without destroying the accuracy of the solution. Both the inviscid and viscous solutions predict the same physics of the flow, although differences are observed in the values of the total forces and in the location of the shock waves. Comparison between numerical results and experimental data is quite satisfactory, but reveals that there is a lot to be done in both areas of investigations before the prediction of unsteady compressible flows becomes a routine procedure.

Author

A92-45548#

CONCEPTS FOR THE STABILITY ANALYSIS OF NLF-EXPERIMENTS ON SWEPT WINGS

H. BIELER (Deutsche Airbus GmbH, Bremen, Federal Republic of Germany) and G. REDEKER (DLR, Institut fuer Entwurfsaerodynamik, Braunschweig, Federal Republic of Germany) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 785-795. refs (AIAA PAPER 92-2706) Copyright

The prediction of aircraft aerodynamic performance and the extrapolation of laminar wind tunnel tests necessitates reliable and practicable criteria for the prediction of laminar-turbulent transition. For swept wings designed for laminar flow control in particular, transition criteria of Tollmien-Schlichting and crossflow instabilities have to be developed and tested for wind tunnel as well as flight Reynolds numbers. Here, the physical properties of Tollmien-Schlichting and crossflow instabilities are reviewed and strategies used to obtain significant N-factors and the least amount of computing for 3D basic flows are discussed. C.D.

A92-45549#

TURBULENT DRAG REDUCTION BY LAMINAR SUBLAYER THICKENING

G. LOEBERT (MBB GmbH, Munich, Federal Republic of Germany) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 796-800. refs (AIAA PAPER 92-2707) Copyright

It is well known that in a boundary layer the turbulent flow region is separated from the stationary wall by a very thin laminar sublayer. The velocity at the inner edge of the turbulent layer is about 40 percent of the freestream velocity. The turbulent layer thus slips on the laminar sublayer with a substantial slip velocity. If the thickness of the laminar sublayer, which is determined by stability criteria, can be increased the slip of the turbulent layer will increase and the fraction drag will decrease. One means of sublayer thickening is to stabilize the laminar flow by a series of longitudinal T-shaped riblets or, equivalently, to allow the sublayer air to flow in a series of square pipes that are partially open to the adjacent turbulent layer. In this paper the flow within and

exterior to such a square slip channel is analyzed, and the resultant drag is calculated as a function of the channel Reynolds number and of the slot width. It is found that it should be possible to reduce turbulent drag by at least 15 percent with such a surface

A92-45550*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

COMPUTATIONAL EVALUATION OF AN AIRFOIL WITH A **GURNEY FLAP**

CORY S. JANG (California Polytechnic State University, San Luis Obispo), JAMES C. ROSS (NASA, Ames Research Center, Moffett Field, CA), and RUSSELL M. CUMMINGS (California Polytechnic State University, San Luis Obispo) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 801-809. refs (Contract NCC2-536)

(AIAA PAPER 92-2708) Copyright

A 2D numerical investigation was performed to determine the effect of a Gurney flap on a NACA 4412 airfoil. A Gurney flap is a flat plate on the order of 1 to 3 percent of the airfoil chord length, oriented perpendicular to the airfoil chord line and located at the trailing edge of the airfoil. An incompressible Navier Stokes code, INS2D, was used to calculate the flow field about the airfoil. The fully turbulent results were obtained using the Baldwin-Barth one-equation turbulence model. Gurney flap sizes of 0.5, 1, 1.25, 1.5, 2, and 3 percent of the airfoil chord were studied. Computational results were compared with experimental results where possible. The numerical solutions show that the Gurney flap increases airfoil lift coefficient with only a slight increase in drag coefficient. Use of a 1.5 percent chord Gurney flap increases the maximum lift coefficient by approximately 0.3 and decreases the angle of attack for a given lift coefficient by more than 3 deg. The numerical solutions exhibit detailed flow structures at the trialing edge and provide a possible explanation for the increased aerodynamic performance.

A92-45551# COMPRESSIBLE NAVIER-STOKES SOLUTIONS FOR A SUCTION BOUNDARY CONTROL AIRFOIL

J. F. SLOMSKI (U.S. Navy, Naval Surface Warfare Center, Bethesda, MD) and W. C. WELTON (Cornell University, Ithaca, IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC. American Institute of Aeronautics and Astronautics, 1992, p. 810-822. refs

(AIAA PAPER 92-2710)

This research examines some details associated with numerical simulation of flow around thick airfoils which use suction as a means of boundary layer control. The 2D, compressible Navier-Stokes equations are solved for flows around a 50 percent thick airfoil with suction slots at about the 70 percent chord location. A five zone C-type grid forms the computational domain. An algebraic turbulence model is used with appropriate modifications to the turbulent length scale in the suction slots and in the wake. Suction was modeled by specification of appropriate velocities along the slot boundary. Solutions were carried out for angles of attack from 0 to 12 degrees, and three different boundary layer suction flow rates. Mach number and Reynolds number based on chord were 0.13 and about 865,000, respectively. All solutions were carried out fully turbulent. Author

A92-45552*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ALLEVIATION OF SIDE FORCE ON TANGENT-OGIVE FOREBODIES USING PASSIVE POROSITY

STEVEN X. S. BAUER (NASA, Langley Research Center, Hampton, VA) and MICHAEL J. HEMSCH (Lockheed Engineering and Sciences Co., Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics

and Astronautics, 1992, p. 823-834. refs (Contract NAS1-19000) (AIAA PAPER 92-2711) Copyright

An experimental investigation to determine the effectiveness of porosity for alleviating side forces on forebodies was conducted in the NASA Langley Research Center 7 x 10 ft High-Speed Wind Tunnel. The study consisted of a comparison of experimental force, moment, and surface pressure results obtained on a fineness ratio 5.0 tangent-ogive porous forebody with 0.020 in. hole diameter and 22 percent porosity with results obtained on a solid forebody. The forebodies were tested with cylindrical afterbodies. The solid forebody was tested with transition grit to simulate fully turbulent conditions and without transition grit to simulate free transition conditions. The extent of porosity on the forebody was varied to determine the extent of porosity needed to alleviate side forces. Static longitudinal and lateral-directional stability and surface pressure data were obtained at Mach numbers of 0.2, 0.5, and 0.8. The angle of attack range was from 5 to 45 deg and roll angles from -90 to 180 deg. The solid forebody exhibited large asymmetries at moderate to high angles of attack causing large side forces and yawing moments. The porous forebody exhibited no significant side forces or yawing moments at any angle of attack tested.

A92-45553*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A LEX BLOWING TECHNIQUE FOR POST-STALL LATERAL **CONTROL OF TRAPEZOIDAL WINGS**

DHANVADA M. RAO (Vigyan, Inc., Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 835-843. Research supported by NASA. refs

(AIAA PAPER 92-2714) Copyright

An exploratory low-speed wind-tunnel investigation of a pneumatic technique for LEX-induced lift augmetation on a low-aspect-ratio trapezoidal wing near C sub L, MAX is reported. The technique involved lateral sheet ejection from LEX edge-slots, with emphasis on nonsymmetrical blowing to obtain incremental roll control at high angles of attack when the aileron power is declining. Preliminary experiments on a pressure instrumented semispan wing model followed by force/moment measurements on a full-span LEX-wing configuration confirmed the effectiveness of LEX blowing for lateral control improvement up to an angle of attack of 45 deg and with a momentum coefficient of less than

A92-45554#

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF LEADING-EDGE EXTENSIONS ON DIRECTIONAL STABILITY AND THE EFFECTIVENESS OF FOREBODY NOSE STRAKES

AN-KUO FU, C. E. LAN (Kansas, University, Lawrence), and LIH-SHYUNG SHYU (Aeronautical Research Laboratory, Taichung, Republic of China) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 844-854. refs (AIAA PAPER 92-2715) Copyright

A generic configuration with a tangent-ogive forebody and leading edge extensions (LEXs) was tested in a 7 ft by 10 ft wind tunnel at a Reynolds number of 1.67 x 10 exp 6/ft. For the baseline configuration without LEXs, directional instability was mainly caused by the forebody. With the LEXs on, the forebody vortices were depressed toward the body surface by the LEX vortices. Consequently, the forebody was not effective in contributing to directional stability or instability. The latter was mainly induced by the vertical tail immersed in the separated flow field from the wing and the burst LEX vortices. Configurations with both small and large symmetric nose strakes were still directionally unstable; the instability was due to the forebody when LEXs were absent and by the vertical tail with LEXs on. A single nose strake at phi(s) large enough to prevent a second vortex from developing was effective in generating a control yawing moment at high angles of attack.

A92-45555*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

FOREBODY VORTEX CONTROL FOR SUPPRESSING WING ROCK ON A HIGHLY-SWEPT WING CONFIGURATION

CARLOS J. SUAREZ, BRIAN R. KRAMER, BERT AYERS, and GERALD N. MALCOLM (Eidetics International, Inc., Aeronautics Div., Torrance, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 855-868. refs (Contract NAS2-12989)

(AIAA PAPER 92-2716) Copyright

Free-to-roll tests were conducted in a wind tunnel with a configuration that consisted of a highly-slender forebody and a 78 deg swept delta wing. A limit cycle oscillation was observed for angles of attack between 22 and 30 deg. In general, the main flow phenomena responsible for the wing-body-tail wing rock are the interactions between the forebody and the wing vortices. Various blowing techniques were evaluated as means of wing rock suppression. Blowing tangentially aft from leeward side nozzles near the forebody tip can damp the roll motion at low blowing rates and stop it completely at higher blowing rates. At the high rates, significant vortex asymmetries are created, causing the model to stop at a non-zero roll angle. Forward blowing and alternating right/left pulsed blowing appear to be more efficient techniques for suppressing wing rock. The oscillations can be damped almost completely at lower blowing coefficients, and, apparently, no major vortex asymmetries are induced. Good agreement is observed between this study and previous water tunnel tests on the same configuration. Author

A92-45556#

SURFACE GRID GENERATION IN A PARAMETER SPACE

JAMSHID SAMAREH-ABOLHASSANI and JOHN E. STEWART (Computer Sciences Corp., Hampton, VA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 869-880. refs (AIAA PAPER 92-2717)

A robust and efficient technique is discussed for surface-grid generation on a general curvilinear surface. This technique is based on a nonuniform parameter space and allows for the generation of surface grids on highly skewed and nonuniform spaced background surface-grids. This method has been successfully integrated into the GRIDGEN software system.

Author

 $\textbf{A92-45557}^{*}\#$ National Aeronautics and Space Administration, Washington, DC.

NUMERICAL SIMULATIONS USING A DYNAMIC SOLUTION-ADAPTIVE GRID ALGORITHM, WITH APPLICATIONS TO UNSTEADY INTERNAL FLOWS

RUSTY A. BENSON, D. S. MCRAE, and JACK R. EDWARDS (North Carolina State University, Raleigh) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 881-894. Research supported by U.S. Navy. refs

(Contract NAGW-1072; F49620-92-J-0189)

(AIAA PAPER 92-2719) Copyright

An investigation into the numerical simulation of unsteady flows is undertaken using a two-stage Runge-Kutta scheme coupled with the dynamic solution-adaptive grid algorithm developed by the authors. The inviscid fluxes are described by a modified Advective Upwind Split Method to eliminate the need for artificial dissipation. A well-documented numerical example containing moving discontinuities is presented that demonstrates the ability of the coupled grid/solver scheme to accurately capture unsteady flowfield phenomena. Applications are to a typical inlet diffuser configuration at Mach 3.0 with excessive back pressure inducing inlet unstart.

A92-45558#

A NEW AUTOMATIC GRID GENERATION ENVIRONMENT FOR CFD APPLICATIONS

D. BERTIN (Aerospatiale, Division Avions, Toulouse, France), J. LORDON (Control Data France, Toulouse), and V. MOREUX (Aerospatiale, Division Avions, Toulouse, France) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 895-903. refs (AIAA PAPER 92-2720) Copyright

This new grid generation environment enables the fluid volume around complex shapes to be meshed rather easily and quickly. The resulting mesh is structured multiblock, it can be generated interactively or in replay mode. Overall, the new system makes it possible to decrease the CFD design cycle time. The system principles and practical handling are described. Some examples of meshes around industrial configurations and samples of aerodynamic calculations are detailed and shown.

A92-45559#

PRISMATIC GRID GENERATION WITH AN EFFICIENT ALGEBRAIC METHOD FOR AIRCRAFT CONFIGURATIONS

Y. KALLINDERIS and S. WARD (Texas, University, Austin) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 904-918. refs (Contract AF-AFOSR-91-0022)

(AIAA PAPER 92-2721) Copyright

The development and applications of a new generation method for prismatic semi-structured grids are described. The method combines algebraic and elliptic steps which yield low computation cost and grid smoothness. This technique has been developed for treatment of complex aircraft configurations with emphasis on generation of a suitable grid to cover the thin viscous regions emcountered in high Reynolds number flow simulations. Employment of prismatic elements is a relatively new approach toward 3-D complex geometry numerical simulations of high Reynolds number flows. The developed grid generator also offers direct control of grid orthogonality and spacing along with its generality for treatment of complex 3-D geometries. The efficiency and robustness of the method to handle complex topologies were investigated.

A.O.

A92-45560*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

VISCOUS FLOW PAST A NACELLE ISOLATED AND IN PROXIMITY OF A FLAT PLATE

KAMRAN FOULADI (Lockheed Engineering and Sciences Co., Hampton, VA) IN: AlAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 919-927. refs (Contract NAS1-19000)

(AIAA PAPER 92-2723) Copyright

Linearized-theory design procedures have proven to be useful in preliminary design stages of supersonic aircraft configurations. These procedures are impaired, however, by their inability to account for certain nonlinear effects inherent in complicated flows. The present computations are aimed at providing necessary information for correction and improvement of a particular linearized design method. Three-dimensional, viscous, supersonic flows past nacelle and nacelle-flat plate configurations are investigated. The thin-layer Navier-Stokes equations are solved using an implicit, upwind-biased, finite-volume method. A hybrid domain decomposition technique is utilized to ease the grid generation task. Computations were made for an unit Reynolds number of 2.0 million per foot and Freestream Mach numbers of 1.6, 2.0, and 2.3.

A92-45561*# National Aeronautics and Space Administration.
Lewis Research Center, Cleveland, OH.
THE FLIP FLOP NOZZLE EXTENDED TO SUPERSONIC
FLOWS

GANESH RAMAN (Sverdrup Technology, Inc., Brook Park, OH), MICHAEL HAILYE (Michigan, University, Ann Arbor), and EDWARD J. RICE (NASA, Lewis Research Center, Cleveland, OH) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 928-951. Previously announced in STAR as N92-23269. refs (AIAA PAPER 92-2724) Copyright

An experiment studying a fluidically oscillated rectangular jet flow was conducted. The Mach number was varied over a range from low subsonic to supersonic. Unsteady velocity and pressure measurements were made using hot wires and piezoresistive pressure transducers. In addition smoke flow visualization using high speed photography was used to document the oscillation of the jet. For the subsonic flip-flop jet it was found that the apparent time-mean widening of the jet was not accompanied by an increase in mass flux. It was found that it is possible to extend the operation of these devices to supersonic flows. Most of the measurements were made for a fixed nozzle geometry for which the oscillations ceased at a fully expanded Mach number of 1.58. By varying the nozzle geometry this limitation was overcome and operation was extended to Mach 1.8. The streamwise velocity perturbation levels produced by this device were much higher than the perturbation levels that could be produced using conventional excitation sources such as acoustic drivers. In view of this ability to produce high amplitudes, the potential for using small scale fluidically oscillated jet as an unsteady excitation source for the control of shear flows in full scale practical applications seems promising.

A92-45562# COMPUTATION OF TURBULENT FLOW ABOUT CONE-DERIVED WAVERIDER

BOR-JANG TSAI, JOHN B. MILES (Missouri-Columbia, University, Columbia), and KAKKATTUKUZHY M. ISSAC (Missouri-Rolla, University, Rolla) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 952-962. Research supported by University of Illinois. refs

(AIAA PAPER 92-2726) Copyright

The paper presents the results of a computational fluid dynamics study of the three-dimensional, turbulent, supersonic flowfield about the forebody of a conical waverider at zero angle of attack. The numerical method uses the flux difference splitting algorithm, as embodied in the Navier-Stokes code entitled CFL3D, developed by NASA-Langley Research Center, and the Baldwin-Lomax algebraic turbulence model is employed. The grid selected and overall correctness of the turbulent flow computations are validated by comparison to counterpart flat plate results. The obtained turbulent flow results about the waverider are compared to previously reported results by the authors for the laminar flow about the same configuration, as well as to available experimental and analytical results.

A92-45563#

ACTIVE CONTROL OF VORTEX STRUCTURES IN A SEPARATING FLOW OVER AN AIRFOIL

J. A. LOVATO (USAF, Frank J. Seiler Research Laboratory, Colorado Springs, CO) and T. R. TROUTT (Washington State University, Pullman) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 963-970. refs

(Contract F49620-90-C-0076; AF-AFOSR-90-0131)

(AIAA PAPER 92-2728)

The effect of tangential-pulsed air control on dynamic separation is investigated for a NACA-0015 airfoil. Forcing frequencies are coupled with the predetermined static poststall fundamental frequencies associated with free shear layer vortex generation. For all cases studied the airfoil is pitched at a constant rate corresponding to an alpha(+) of 0.05. Results confirm that the active control alters the nature of the unsteady separating boundary layer. The leading edge vortex characteristic to unsteady airfoil

flows is attenuated up to 30 deg angle of attack, and upper surface velocity magnitudes are significantly increased over the natural case. In addition, the active forcing appears to create or enhance development of numerous flow regions on the upper airfoil surface.

Author

A92-45564#

VISUALIZATION OF STOPPING FLOW OVER AIRFOILS

HAUKE BUSCH and PETER FREYMUTH (Colorado, University, Boulder) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 971-981. refs

(AIAA PAPER 92-2730) Copyright

The vortical patterns of nearly impulsively stopped steady flow over airfoils with NACA 0015 profile have been visualized and their development are described. Dependence of pattern development on angle of attack and on Reynolds number have been explored. In case of detached flow vortex pairs or mushrooms developed near the leading edge of the airfoil and for the higher angles of attack also near the trailing edge. In case of attached flow which occurred at low angles of attack, not greater than 10 deg, and even then at sufficiently high Reynolds numbers only, a leading edge and a trailing edge stopping vortex carrying the circulation of the airfoil were observed simultaneously.

A92-45565#

EXPERIMENTAL INVESTIGATION OF VORTEX DYNAMICS ON DELTA WINGS

G. GUGLIERI (CNR, Turin, Italy) and F. B. QUAGLIOTTI (Torino, Politecnico, Turin, Italy) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 982-989. refs

(AIAA PAPER 92-2731) Copyright

Delta wing vortex dynamics was investigated by extensive wind tunnel testing of a 65 degree delta wing. At moderate angles of attack the leeward flow field is dominated by organized vortical flow structures from the leading edge. At high angles of attack vortex breakdown leads to changes in the aerodynamic coefficients which affect wing performance. Vortex breakdown was studied using tests on the delta wing under static and dynamic conditions with forced oscillatory motions. Varying angles of attack and Reynolds numbers were used to determine factors which influence vortex breakdown. Results indicate that the position of breakdown is determined by the pressure gradient along the vortex, initial axial core velocity and slideslip angle. Flow visualization techniques were effective in visualization of vortical flow and breakdown in dynamic conditions. The correlation of pressure gradients with force measurements and flow visualizations at varying attack and sideslip angles under static and dynamic conditions, and to different oscillation frequencies for dynamic conditions are presented. The data acquisition system, pressure measurement system, and flow visualization method are described. A.O.

A92-45566#

DYNAMIC LEX/FOREBODY VORTEX INTERACTION EFFECTS

L. E. ERICSSON (Lockheed Missiles and Space Co., Inc., Sunnyvale, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 990-996. refs

(AIAA PAPER 92-2732) Copyright

Laminar subscale tests and full-scale flight of the F/A-18 aircraft showed wing rock. This was not observed during wind tests at an intermediate Reynolds number. An analysis of recent experimental results and a separation flow hypothesis which offers an explanation of these observations are presented. Results indicate that dynamic simulation of self-excited oscillations in susbscale tests is not possible unless the full-scale Reynolds number is simulated. The present analysis indicates that even in the presence of moving wall effects analytic extrapolation to full-scale vehicle dynamics from subscale tests may be possible.

A.O.

A92-45567#

TIME ACCURATE COMPUTATION OF UNSTEADY TRANSONIC FLOWS AROUND AN AIRFOIL WITH OSCILLATING FLAP ON **DYNAMIC GRID**

CHANGJU KIM and DONGHO LEE (Seoul National University, Republic of Korea) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 997-1004. Research supported by Korea Science and Engineering Foundation. refs

(AIAA PAPER 92-2733) Copyright

The time accurate delta(k)-correction iterative scheme has been applied to calculate the unsteady flow around an airfoil with an oscillating plain flap or an oscillating slotted-flap. An efficient generation method of the dynamic grid has been developed and the topology of the present dynamic blocked-grid generation has its base on the structured initial grid with nearly continuous metric distribution across boundaries of the blocked-grid. Therefore, the numerical algorithm has no dependency on the regenerated dynamic grid and can be easily programmed and vectorized. Also, to reduce the geometrically induced error by volumetric variations of the grid system, the Geometric Conservation Law (GCL) proper to the Roe's flux difference splitting scheme and the Matsuno's delta(k)-C time-integration have been derived in the uniform flow condition and applied to the oscillating NACA0012 airfoil resulting in good agreement. Also, the numerical computations are carried out for B-type shock motion around a NACA64A010 airfoil with an oscillating plain flap and unsteady flow around an NLR7301 supercritical airfoil with an oscillating slotted flap. The usefulness and the efficiency of the present blocked dynamic-grid generation method are found for the unsteady transonic flowfields due to the oscillating control surface.

A92-45568*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

NAVIER-STOKES COMPUTATION OF WING LEADING EDGE TANGENTIAL BLOWING FOR A TILT ROTOR IN HOVER

IAN FEJTEK and LEONARD ROBERTS (Stanford University, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 1006-1015. refs (Contract NCC2-55)

(AIAA PAPER 92-2608) Copyright

The effect of a thin tangential jet located at the leading edge of the wing of a tilt rotor configuration in hover is computed using the thin-layer Navier-stokes equations. Computations showed that leading edge tangential blowing is effective in reducing the download caused by the impingement of the rotor download caused by the impingement of the rotor downwash on the wing. Results from the numerical model support previous experimental findings that download reduction is due mainly to a decrease in upper surface pressure and not an increase in pressure on the lower surface. The numerical solution clearly shows that because of the three-dimensionality of the flow field, the download could be reduced further by allowing a spanwise variation in blowing strength.

A92-45569#

PREDICTION OF THE VISCOUS TRANSONIC AERODYNAMIC PERFORMANCE OF SUPERCRITICAL AEROFOIL SECTIONS

LESLIE J. JOHNSTON (University of Manchester Institute of Science and Technology, England) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, IN: AIAA Applied Technical Papers. Pt. 2. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 1016-1025. refs (AIAA PAPER 92-2653) Copyright

A recently-developed computational method is used to predict the aerodynamic performance of the CAST 7 supercritical aerofoil section over a wide range of transonic conditions, from fully-subcritical flow to supercritical flow with shock-induced separation. The method is based on a finite-volume spatial discretization of the compressible Reynolds-averaged

Navier-Stokes equations. Reynolds stresses appearing in the governing mean-flow equations are modeled via the eddy viscosity concept, in conjunction with a one-equation turbulence model. This latter model involves the solution of an additional modeled transport equation for the turbulent kinetic energy. Solutions are obtained by time-marching the unsteady flow equations to the steady-state using an explicit multi-stage scheme. Results are presented for the CAST 7 aerofoil, covering incidence angle sweeps at freestream Mach numbers of 0.70 and 0.76, and a Mach number sweep at constant incidence angle. Comparisons with experimental measurements indicate that the general features of the surface pressure distribution and trends for the integrated loads are reasonably well-predicted.

A92-45570#

COMPUTATIONS OF HYPERSONIC FLOWS AROUND A THREE-DIMENSIONAL CONCAVE/CONVEX BODY

SURESH MENON, ALAN MUELLER (Quest Integrated, Inc., Kent, WA), JIM L. WONG (TRW, Inc., San Bernardino, CA), and JAMIE KRIEBEL (USAF, Washington, DC) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, 14 p. refs (AIAA PAPER 92-2606)

A numerical scheme was developed for computing steady-state flowfields around a complex concave/convex shaped vehicle in a turbulent hypersonic flow. The numerical scheme used a multistage, multigrid approach with a second-order total variation diminishing scheme to resolve the strong bowshock. The code was used to simulate the flowfield around the concave/convex vehicle at various angles of attack. A complex embedded shock structure was found at the inflection location of the expansion/compression surface. Due to the interaction between the bowshock and the secondary embedded shock, a shear layer was created and the transmitted shock impinged on the surface at an axisymmetrical flow generated high local heating and pressure. This shear layer formed a jetlike flow at the angle of attack, which could cause substantial damage downstream at its reattachment location.

A92-45571#

A TRANSONIC/SUPERSONIC/HYPERSONIC CFD ANALYSIS OF THE ENTRY SPACE SHUTTLE ORBITER

EDWARD C. MA (Lockheed Engineering and Sciences Co., Houston, TX) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 14 p. refs (AIAA PAPER 92-2614)

Numerical simulations of the STS-28 reentry trajectory have been performed using in-house Euler solver E3D. The 3D Euler equations are integrated by means of a time marching finite volume shock capturing method, based on cell centered and upwind evaluation of the cell face fluxes with van Leer or Roe's flux-splitting techniques. Computed pressure coefficients at several Mach numbers 0.95, 1.4, 2.0, 2.5, 3.5, and 5.0 are compared with STS-28 flight data and OA146 airloads data base over a wide range of angles of attack (7-30 deg) in order to determine the applicability of the code for different flight regimes. Solutions are in good agreement with available experimental data. It is demonstrated that the E3D Euler code is capable of accurately predicting surface properties for entry Orbiter configuration. Author

A92-45572#

TRANSONIC CALCULATIONS FOR WINGS WITH DEFLECTED **CONTROL SURFACES**

VINCENT D. CHIN (Douglas Aircraft Co., Long Beach, CA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 13 p. refs (AIAA PAPER 92-2617) Copyright

This paper describes a method for predicting transonic flows about wing/body configurations with deflected control surfaces. A multi-zone capability was added to an existing wing/body Euler code for structured meshes and then coupled to a finite difference interactive boundary-layer method to simulate viscous effects. Solutions about a configuration with a deflected aileron show good correlation when compared to experimental data.

A92-45574*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SURFACE AND FLOW FIELD MEASUREMENTS IN A SYMMETRIC CROSSING SHOCK WAVE/TURBULENT **BOUNDARY LAYER FLOW**

D. O. DAVIS and W. R. HINGST (NASA, Lewis Research Center, Cleveland, OH) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 19 p. refs (AIAA PAPER 92-2634) Copyright

Results of an experimental investigation of a symmetric crossing shock/turbulent boundary layer interaction are presented for a Mach number of 3.44 and deflections angles of 2, 6, 8 and 9 deg. The interaction strengths vary from weak to strong enough to cause a large region of separated flow. Measured quantities include surface static pressure and flowfield Pitot pressures. Pitot profiles in the plane of symmetry through the interaction region are shown for various deflection angles. Oil flow visualization and the results of a trace gas streamline tracking technique are also presented.

A92-45575*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SEPARATION CONTROL ON HIGH REYNOLDS NUMBER **MULTI-ELEMENT AIRFOILS**

JOHN C. LIN, STEPHEN K. ROBINSON, ROBERT J. MCGHEE (NASA, Langley Research Center, Hampton, VA), and WALTER O. VALAREZO (Douglas Aircraft Co., Long Beach, CA) Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 17 p. refs (AIAA PAPER 92-2636)

Small surface-mounted vortex generators were investigated as means for the control of a boundary-layer separation on a 2D single-flap three-element high-lift system at near-flight Reynolds numbers and in landing configurations. Wind-tunnel results obtained for small vane-type vortex generators mounted on a multielement airfoil showed that vortex generators as small as 0.18 percent of total chord can effectively reduce or eliminate boundary-layer separation on the flap at approach conditions. It was found that both the outerrotating and the corotating streamwise vortices were effective in reducing flow separation.

A92-45576*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

EXPLORATORY INVESTIGATION OF A SPANWISE BLOWING CONCEPT FOR TIP-STALL CONTROL ON CRANKED-ARROW WINGS

DHANVADA M. RAO (Vigyan, Inc., Hampton, VA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 10 p. Research supported by NASA. (AIAA PAPER 92-2637) Copyright

A novel blowing concept aimed at controlling the tip-panel stall of 'cranked-arrow' type wings was experimentally investigated. A spanwise-directed jet sheet tangential to the upper surface, blown from a chordwise slot located at the crank, interacts obliquely with the external flow to generate a powerful and highly controllable vortex, substantially covering the tip panel. The incremental suction due to this jet vortex, coupled with its flow stabilization effect improves the tip-panel maximum lift and stall characteristics, leading to pitch-up alleviation and lateral control augmentation. Low-speed wind tunnel flow visualizations, pressure measurements and force/moment results are presented validating the flow-control concept and illustrating its potential on a generic crank-arrow wing model.

A92-45578#

A NUMERICAL STUDY OF CONTROL SURFACE BUZZ USING COMPUTATIONAL FLUID DYNAMIC METHODS

DENNIS F. FUGLSANG, LARRY O. BRASE, and SHREEKANT AGRAWAL (McDonnell Aircraft Co., Saint Louis, MO) Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 13 p. refs (Contract N00019-84-C-0240)

(AIAA PAPER 92-2654) Copyright

The control-surface rudder buzz recorded during the development of the T-45A Goshawk aircraft was investigated using computational fluid dynamics methods in conjunction with results of aircraft flight tests. The buzz was attributed to a forced oscillation caused by unstable shock wave motion and shock-induced separation. The onset of buzz is believed to be a result of inviscid unsteady shock wave motion; however, separation of the boundary layer at higher oscillation amplitudes is crucial for sustaining and moderating the control-surface motion. Steady-state Navier-Stokes calculations were performed, using the TLNS3D code, to verify the existence of shock waves and flow separation.

A92-45582#

COMPARISON OF TWO FLUX SPLITTING SCHEMES FOR CALCULATION OF OGIVE-CYLINDER AT M=3.5 AND ALPHA = 18 DEG

T. HSIEH and A. B. WARDLAW, JR. (U.S. Navy, Naval Surface Warfare Center, Silver Spring, MD) AlAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 16 p. refs (AIAA PAPER 92-2667)

Comparisons are presented of Navier-Stokes solutions for an ogive cylinder at M = 3.5 and alpha = 18 deg using the Roe's flux-difference splitting and Van Leer's flux vector splitting schemes. This problem features massive crossflow separation which forms vortices on the leeside of the cylinder. Solutions are computed for laminar and turbulent cases using H and C grids. It was found that Roe's scheme is less robust and requires more computing time. The difference in the predicted flowfield is small, typically less than 1 percent in lift coefficient. For engineering applications, convergence with respect to lift instead of the residual is the criterion used to determine steady state. For reason not fully understood, the laminar solution is, overall, in better agreement with the turbulent experiment than is the turbulent solution.

Author

A92-45583*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

FOREBODY FLOW CONTROL ON A FULL-SCALE F/A-18 **AIRCRAFT**

WENDY R. LANSER and LARRY A. MEYN (NASA, Ames Research Center, Moffett Field, CA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 12 p. refs (AIAA PAPER 92-2674) Copyright

A full-scale F/A-18 was tested in the 80- by 120-Foot Wind Tunnel at NASA Ames Research Center to measure the effectiveness of pneumatic forebody vortex control devices. By altering the forebody vortex flow, yaw control can be maintained to angles of attack greater than 50 deg. Two forebody vortex control devices were tested: a discrete circular jet and a tangential slot. The tests were conducted for angles of attack between 25 and 50 deg, and angles of sideslip from 0 to \pm /- 15 deg. The Reynolds number based on wing mean aerodynamic chord ranged from 4.5 x 10 exp 6 to 12.0 x 10 exp 6. The time-averaged side forces and yawing moments, along with both time-averaged and time-dependent pressures on the forebody of the aircraft are presented here for various configurations. Of particular interest was the results that the tangential slot blowing had a greater effect on the yawing moment than the discrete circular jet. Additionally, it was found that blowing very close to the radome apex was not as effective as blowing slightly farther aft on the radome, and that a 16-inch slot was more effective than either an 8- or 48-inch long slot. Author

A92-45584*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

FULL-SCALE HIGH ANGLE-OF-ATTACK TESTS OF AN F/A-18 LARRY A. MEYN, WENDY R. LANSER (NASA, Ames Research Center, Moffett Field, CA), and KEVIN D. JAMES (Sterling Federal Systems, Inc., Palo Alto, CA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 13 p. refs (AIAA PAPER 92-2676) Copyright

This paper presents an overview of high angle-of-attack tests of a full-scale F/A-18 in the 80- by 120-Foot Wind Tunnel of the

National Full-Scale Aerodynamic Complex at NASA Ames Research Center at Moffett Field, California. A production aircraft was tested over an angle-of-attack range of 18 to 50 deg and at wind speeds of up to 100 knots. These tests had three primary test objectives. Pneumatic and mechanical forebody flow control devices were tested at full-scale and shown to produce significant yawing moments for lateral control of the aircraft at high angles of attack. Mass flow requirements for the pneumatic system were found to scale with freestream density and speed rather than freestream dynamic pressure. Detailed measurements of the pressures buffeting the vertical tail were made and spatial variations in the buffeting frequency were found. The LEX fence was found to have a significant effect on the frequency distribution on the outboard surface of the vertical fin. In addition to the above measurements, an extensive set of data was acquired for the validation of computational fluid dynamics codes and for comparison with flight test and small-scale wind tunnel test results.

A92-45585#

PREDICTION OF LEADING-EDGE VORTEX BREAKDOWN ON A DELTA WING OSCILLATING IN ROLL

X. Z. HUANG and E. S. HANFF (National Research Council of Canada, Institute for Aerospace Research, Ottawa) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 14 p. Research supported by USAF and DND. refs (AIAA PAPER 92-2677) Copyright

A method for the prediction of leading-edge vortex breakdown on a 65 deg delta wing at high incidence is proposed. The approach, based on the swirl parameter, takes into account quasi-steady as well as unsteady effects, allowing it to predict breakdown with reasonable accuracy both for static as well as roll oscillation conditions.

Author

A92-45588#

QUANTIFICATION OF CANARD AND WING INTERACTIONS USING SPATIAL CORRELATION VELOCIMETRY

P. A. FAWCETT, R. B. FUNK, and N. M. KOMERATH (Georgia Institute of Technology, Atlanta) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 14 p. Research supported by NSF. refs

(Contract DAAL03-88-C-0003)

(AIAA PAPER 92-2687) Copyright

An experiment where a canard moves slowly in close proximity to a wing is used to develop the SCV technique for quantifying complex unsteady velocity fields. A dual-camera system removes previous limitations on flow velocity, and improves spatial resolution. Using laser sheet videography, both flow visualization and velocity measurements are performed while the test configuration is changed through a range of test conditions in a short time. The need to hold the configuration steady at each setting is removed. Automated postprocessing uses parallel computer algorithms to perform iterative analysis of the velocity field. Moving-window averaging, predictive correlation, pixel interpolation, and multiple-peak searching techniques are discussed. Sequences of flow visualization and velocity field images are presented for various configurations with the canard and wing showing attached and separated flows. Velocity variations over the wing show the expected acceleration and deceleration profiles, which are greatly modified by canard interaction. Velocity profiles across the flow show the jetlike flow between the canard and the wing, as well as the wake of the canard. Outstanding problems and sources of Author error are discussed.

A92-45590#

A COMPACT HIGHER ORDER EULER SOLVER FOR UNSTRUCTURED GRIDS WITH CURVED BOUNDARIES

D. W. HALT and R. K. AGARWAL (McDonnell Douglas Research Laboratories, Saint Louis, MO) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 10 p. Research sponsored by McDonnell Douglas Corp. refs (AIAA PAPER 92-2696) Copyright

A new method is presented for solving the Euler equations on

unstructured grids with improved efficiency using compact higher order polynomials. The method uses a characteristic-based approach within a cell-centered finite volume framework. Mutually orthogonal polynomials are used to represent the conservation variables over each cell. Solutions are presented for several 2D and 3D cases including the flow over a sinusoidal bump, an NLR 7301 airfoil with supercritical flow, a NACA 0012 airfoil with a shock and the ONERA M6 wing with a lambda shock. Solutions are shown from first order to fourth order spatial accuracy. Comparisons are shown with a hodograph solution for the supercritical airfoil and with available data for the NACA 0012 airfoil. Comparisons made with CFL2D demonstrate an order of magnitude improvement in accuracy and efficiency for the sinusoidal bump.

A92-45592#

AN UNSTRUCTURED APPROACH TO THE DESIGN OF MULTIPLE-ELEMENT AIRFOILS

DON W. KINSEY (USAF, Wright Laboratory, Wright-Patterson AFB, OH) and BRUCE A. JOLLY (Sverdrup Technology, Inc., Eglin AFB, FL) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 9 p. refs (AIAA PAPER 92-2709) Copyright

This paper describes a design procedure for multiple-element airfoils. A robust, semiinverse geometry modification technique was combined with an unstructured Euler solver and a 'spring analogy' technique for grid movement. In theory, the resulting code may be used to determine the geometry of any number of arbitrary bodies from a given pressure distribution. A description of the techniques used and the results for two and three element airfoils are presented in this paper.

Author

A92-45593#

SEPARATION PATTERNS AND FLOW STRUCTURES ABOUT A HEMISPHERE-CYLINDER AT HIGH INCIDENCES

K. C. WANG (San Diego State University, CA) and T. HSIEH (U.S. Navy, Naval Surface Warfare Center, Silver Spring, MD) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 18 p. refs (AIAA PAPER 92-2712)

Navier-Stokes solutions for an incompressible flow over a hemisphere-cylinder at incidence of 10, 30 and 50 deg are obtained. The computed surface pressure distribution and the separated flow structure over the body surface as well as the meridional planes and the cross-planes are presented. The separation trend vs. incidence is compared with experimental flow visualizations in good agreement.

A92-45595#

ON THE AERODYNAMICS/DYNAMICS OF STORE SEPARATION FROM HYPERSONIC AIRCRAFT

GARY NEWMAN, KAREN FULCHER (Textron Defense Systems, Wilmington, MA), ROBERT RAY (General Applied Science Laboratories, Inc., Ronkonkoma, NY), and MARK PINNEY (USAF, Wright Laboratory, Wright-Patterson AFB, OH) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 12 p. refs

(AIAA PAPER 92-2722) Copyright

First order effects of flowfield nonuniformities associated with hypersonic shock layers and wakes on the dynamics and aerodynamics of a store deployed from a hypersonic vehicle were studied. Aerodynamic coefficients for the calculation of store trajectories were determined from an 'embedded' hypersonic impact theory methodology which has been validated by comparison with experimental data. Trajectories were computed using a 6 DOF dynamics code. Effects of deployment location, ejection velocity, initial pitch angle and pitch rate of the store on its trajectory and on the stability of its trajectory were studied.

Author

A92-45596*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AN INVESTIGATION OF PASSIVE CONTROL METHODS FOR SHOCK-INDUCED SEPARATION AT HYPERSONIC SPEEDS

R. RALLO, M. WALSH (NASA, Langley Research Center, Hampton, VA), and BRAM VAN LEER (Michigan, University, Ann Arbor) AlAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 17 p. refs

(AIAA PAPER 92-2725) Copyright

The effectiveness of several passive control techniques on shock-induced boundary-layer separation at hypersonic speed was investigated. Two approaches for alleviating the turbulent separation losses were examined: porous surface mass transfer and surface grooving. A total of four perforated surfaces with varying porosities were evaluated, and three groove orientations with respect to the freestream direction were studied. A comparison of the results from passive control techniques with those from an 'uncontrolled' shock impingement showed that the porous surface with the greatest porosity provided the greatest reduction in the pressure rise across the oblique shock wave. The grooved surface tested were found to be not effective; each of the grooved configurations examined increased the peak pressure value. I.S.

A92-45597#

AERODYNAMICALLY BLUNT AND SHARP BODIES

W. H. MASON and JAEWOO LEE (Virginia Polytechnic Institute and State University, Blacksburg) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 7 p. refs (AIAA PAPER 92-2727) Copyright

(AIAA PAPER 92-2727) Copyright
Computational fluid dynamics studies at supersonic and hypersonic speeds have resulted in an improved understanding of the meaning of aerodynamically, as opposed to geometrically, sharp and blunt shapes. An analytic investigation using Newtonian theory was conducted to support the computational results. Based on this work, a new criteria for the definition of an aerodynamically sharp shape is proposed. Defining the power law shape to be the relevant gauge function, bodies with n greater than 2/3 are classified aerodynamically sharp, even though the initial body slope, dr/dx, is 90 deg. The paper provides a description of the analysis that resulted in the new sharp and blunt shape criteria for aerodynamics.

A92-45598*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MEASUREMENTS OF THE UNSTEADY VORTEX FLOW OVER A WING-BODY AT ANGLE OF ATTACK

BENOIT DEBRY, NARAYANAN M. KOMERATH, SHIUH-GUANG LIOU, J. CAPLIN, and JASON LENAKOS (Georgia Institute of Technology, Atlanta) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 12 p. refs (Contract NAG1-1278)

(AIAA PAPER 92-2729) Copyright

Measurements of the unsteady vortex flow over a wing-body at high angles of attack were carried out on a generic test model of a pointed body of revolution with double-delta wings. Vortex patterns and trajectories were quantified from digitized laser sheet video images. The velocity-field measurements showed the jetlike flow in the unburst vortex, unsteady secondary structures below the primary core, and then the reversed flow in the burst vortex. Results of hot-film anemometry revealed the presence of peak frequencies in the velocity spectra over the wing and near the trailing edge, which varied linearly with freestream speed and increased as the measurement point moved upstream. Good Strouhal correlation was found with previous results obtained for a smaller generic wing-body model.

A92-45827

CALCULATION OF POTENTIAL FLOW AROUND AIRFOILS USING A DISCRETE VORTEX METHOD

GEORGE GIANNAKIDIS (Imperial College of Science, Technology, and Medicine, London, England) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1689, 1690. Abridged. Research

supported by Department of Trade and Industry of England. refs Copyright

A discrete vortex method for calculating the potential flow around arbitrary 2D airfoils is presented, in which the Kutta-Joukowski condition is introduced as an extra equation and the final overdetermined linear system of equations is solved using Gaussian elimination with partial pivoting to remove the redundancy (instead of dropping one equation as was done in previous methods). A comparison of the present scheme with the widely used methods of Smith and Hess (1966) and Kennedy and Marsden (1976) showed that the present method offers higher accuracy for the same computational cost.

A92-45828

NONUNIFORM MOTION OF LEADING-EDGE VORTEX BREAKDOWN ON RAMP PITCHING DELTA WINGS

J. J. MIAU, R. C. CHANG, J. H. CHOU (National Cheng Kung University, Tainan, Republic of China), and C. K. LIN (Chung-Shan Institute of Science and Technology, Taichung, Republic of China) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1691-1702. refs Copyright

Vortex flow characteristics on ramp pitching delta wings of sweep angles from 59 to 70 deg were studied by flow visualization and LDA measurement. Experimental observations indicate that the movement of the breakdown point is strongly dependent on the sweep angles and the pitching rates. The moving behavior of the breakdown point can be characterized by the occurrence of two delays. The first delay is due to the fact that the flow initially takes a length of time comparable to C/U(infinity) to respond to the pitching motion. The second delay exists only for specific sweep angles and occurs in the course of pitching-up motion. It is characterized by the phenomenon that the breakdown point is moving slowly or even standing still above the wing surface for a certain length of time. The chordwise location corresponding to this occurrence shifts upstream as the pitching rate increases. This delay diminishes as the sweep angle increases. The LDA data obtained further reveal that both delays are associated with the underdevelopment of the primary vortex. Author

A92-45829

AERODYNAMIC CHARACTERISTICS OF HOAR FROST ROUGHNESS

R. J. KIND and M. A. LAWRYSYN (Carleton University, Ottawa, Canada) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1703-1707. Research supported by NSERC. Previously cited in issue 06, p. 801, Accession no. A91-19413. refs Copyright

A92-45839

VISCOUS HIGH-SPEED FLOW COMPUTATIONS BY ADAPTIVE MESH EMBEDDING TECHNIQUES

F. GRASSO, M. MARINI, and M. PASSALACQUA (Roma I, Universita, Rome, Italy) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1780-1788. Previously cited in issue 07, p. 969, Accession no. A91-21381. refs Copyright

A92-45840* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AEROTHERMODYNAMICS OF A 1.6-METER-DIAMETER SPHERE IN HYPERSONIC RAREFIED FLOW

V. K. DOGRA (Vigyan Research Associates, Inc., Hampton, VA), R. G. WILMOTH, and J. N. MOSS (NASA, Langley Research Center, Hampton, VA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1789-1794. Previously cited in issue 06, p. 803, Accession no. A91-19462. refs Copyright

A92-45845* National Aeronautics and Space Administration.
Ames Research Center, Moffett Field, CA.
STREAMLINES, VORTICITY LINES, AND VORTICES AROUND
THREE-DIMENSIONAL BODIES

LESLIE A. YATES (Eloret Institute, Palo Alto, CA) and GARY T. CHAPMAN (California, University, Berkeley) AlAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1819-1826. Previously cited in issue 06, p. 802, Accession no. A91-19439. refs (Contract NCC2-583) Copyright

A92-45858

SEPARATED HIGH ENTHALPY DISSOCIATED LAMINAR HYPERSONIC FLOW BEHIND A STEP - PRESSURE MEASUREMENTS

S. L. GAI (Australian Defence Force Academy, Campbell, Australia) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1915-1918. refs Copyright

Results are presented of pressure measurements at three flow conditions, conducted under conditions similar to those described by Gai et al. (1989) (i.e. with velocities and enthalpies near those experienced during the flight of an aeroassisted space transfer vehicle). It is shown that general features of the hypervelocity laminar dissociated flow behind a step are qaualitatively similar to those of an undissociated flow at moderate Mach numbers. The distinguishing feature of the present flow is the appearance of a thick shear layer behind the step, which shows very little curvature, resulting in a gradual rise of pressure behind the step, especially postreattachment.

A92-45859

NEW METHOD OF SWIRL CONTROL IN A DIFFUSING S-DUCT P. F. WENG and R. W. GUO (Nanjing Aeronautical Institute, People's Republic of China) (CUSAE '91; Proceedings of the 1st China-USSR Seminar on Aero Engines, Nanjing, People's Republic of China, Apr. 15-20, 1991, p. 5-14) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1918, 1919. Previously cited in issue 11, p. 1718, Accession no. A92-29710. refs Copyright

A92-46264* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DISCRETE MODES AND CONTINUOUS SPECTRA IN SUPERSONIC BOUNDARY LAYERS

P. BALAKUMAR and M. R. MALIK (High Technology Corp., Hampton, VA) Journal of Fluid Mechanics (ISSN 0022-1120), vol. 239, June 1992, p. 631-656. refs (Contract NAS1-18240) Copyright

The disturbance field induced due to a harmonic point source consists of discrete eigenmodes and a continuous spectrum; these are studied by using generalized Fourier transform techniques. For a supersonic boundary layer, there exist seven branches of the continuous spectrum in the complex wavenumber space, four of which (two acoustic waves, one vorticity wave and one entropy wave) contribute to the flowfield downstream of the source. The discrete eigenmodes spring off from these branches at some critical Reynolds numbers. The results for Mach 2 and 4.5 boundary layers show that the receptivity coefficients for the stable discrete modes are much larger than that for the unstable mode. Therefore, the flow very near the source is dominated by the continuous spectrum and the stable discrete modes. However, the unstable mode takes over sufficiently far away from the source. It is shown that it is only necessary to consider the first few discrete modes to construct the solution. Calculations also show that, in a supersonic boundary layer, upstream influence from a localized disturbance is minimal.

IIIIai.

A92-46431* National Aeronautics and Space Administration, Washington, DC.

WAVES AND THERMODYNAMICS IN HIGH MACH NUMBER PROPULSIVE DUCTS

R. J. STALKER (Queensland, University, Brisbane, Australia) IN: High-speed flight propulsion systems. Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1991, p. 237-264. Research supported by Australian Research Grants Scheme.

refs (Contract NAGW-674) Copyright

The propulsive effects of waves in ducts, especially at high Mach numbers, are investigated, focusing on drag and thrust and on the conversion of heat into waves which produce thrust. It is shown that essentially all of the work done by an expanding fluid passing through a duct at high Mach number is delivered in the form of waves, and that duct surface angles exist that are optimum for the production of thrust from a wave. The effects of wave phenomena on drag and thrust are considered by extending the concept of a Busemann biplane into that of a 'Busemann scramjet, taking 'off-design' performance into account. An idealized model of a streamtube with heat addition is developed, and flow mechanisms involved in generating thrust by the expansion of this streamtube in an exhaust nozzle are examined.

A92-46441

THE INVISCID COMPRESSIBLE GOERTLER PROBLEM IN THREE-DIMENSIONAL BOUNDARY LAYERS

ANDREW DANDO (Manchester, Victoria University, England) Theoretical and Computational Fluid Dynamics (ISSN 0935-4964), vol. 3, no. 5, May 1992, p. 253-265. Research supported by SERC. refs Copyright

Numerical solutions for the growth rates of Goertler vortices in a compressible three-dimensional flow in the inviscid limit of a large Goertler number are investigated. A range of Mach numbers are examined and find that there are three different types of behavior for the mode growth-rate, corresponding to whether the flow is incompressible, has a Mach number small enough so that temperature-adjustment-layer modes do not appear in the two-dimensional case, or has a Mach number large enough so that they do. It is found that it takes a considerably greater crossflow to destroy the Goertler vortices for moderate Mach numbers than it did in the incompressible case looked at by Bassom and Hall (1991). From this it is believed that Goertler vortices may well still be a cause of transition for many practical compressible inviscid three-dimensional flows.

A92-46519

EFFECT OF A FAN OF RAREFACTION WAVES ON THE DEVELOPMENT OF DISTURBANCES IN A SUPERSONIC BOUNDARY LAYER [O VLIIANII VEERA VOLN RAZREZHENIIA NA RAZVITIE VOZMUSHCHENII V SVERKHZVUKOVOM POGRANICHNOM SLOE]

S. A. GAPONOV, A. D. KOSINOV, A. A. MASLOV, and S. G. SHEVEL'KOV PMTF - Prikladnaia Mekhanika i Tekhnicheskaia Fizika (ISSN 0044-4626), no. 2, Mar.-Apr. 1992, p. 52-55. In Russian. refs Copyright

Experiments were conducted in a supersonic wind tunnel in order to study the boundary layer stability during its interaction with a fan of rarefaction waves. The results indicate that the nonuniformity generated by flow turning in the supersonic boundary layer is the cause of the disturbances. Acoustic waves in the nonuniform region that are external to the boundary layer generate vortex disturbances.

A92-46626

SMOOTH SOLUTIONS FOR TRANSONIC GASDYNAMIC EQUATIONS [GLADKIE RESHENIIA URAVNENII TRANSZVUKOVOI GAZODINAMIKI]

NIKOLAI A. LAR'KIN Novosibirsk, Russia, Izdatel'stvo Nauka, 1991, 144 p. In Russian. refs (ISBN 5-02-029345-8) Copyright

New results of the mathematical theory of the asymptotic equations of transonic gas dynamics are presented. Statements of boundary value problems for stationary and nonstationary equations modeling Laval nozzle flows are examined from the standpoint of their unique solvability and qualitative behavior of the solution. The nonlinear stability of stationary solutions and stabilization of nonstationary solutions at infinity are analyzed. In

addition to classical forms of transonic flow equations, consideration is also given to mathematical models allowing for the effects of viscosity and heat conductivity.

A92-46778

UNSTEADY AERODYNAMICS OF A WORTMANN WING AT LOW REYNOLDS NUMBERS

H.-T. LIU (Quest Integrated, Inc., Kent, WA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 532-539. Research sponsored by Quest Integrated, Inc. (Contract N00014-85-C-0214) Copyright

The unsteady effects of turbulence and gusts on the performance of a full-scale Wortmann FX 63-137 wing for remotely piloted vehicle applications were studied by conducting experiments in the atmospheric boundary layer. The wing, which had an aspect ratio of 6, was mounted on an instrumented truck equipped for force/moment and wind measurements. The vehicle remained stationary, and the wing was aligned with the prevailing wind. The wing experienced predominantly a plunging rather than a pitching motion, together with sweeping and longitudinal oscillations, due to the unsteady three-dimensional wind field. The chord Reynolds number ranged from 250,000 to 450,000, and the turbulence intensity ranged from 8 to about 20 percent. From the spectra of the wind components, the reduced frequencies experienced by the wing may be up to 0.1 or higher, indicating that unsteady effects are important. The results show significant lift overshoot, resulting in an increase in the maximum lift coefficient and stall angle. The aerodynamic coefficients do not show pronounced hysteresis loops. A significant reduction of the minimum drag coefficient was also observed, consistent with the theory of a rigid-wing plate undergoing plunging oscillation. It was concluded that the fluctuating wind field significantly improved the wing's maneuverability and endurance.

A92-46781

FLOW OVER A TWIN-TAILED AIRCRAFT AT ANGLE OF ATTACK. II - TEMPORAL CHARACTERISTICS

N. M. KOMERATH, R. J. SCHWARTZ, and J. M. KIM (Georgia Institute of Technology, Atlanta) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 553-558. refs (Contract F09063-85-G-3104)

Hot-film anemometry was used to study the frequency content of the fluctuation field over scale models of the F-15 aircraft at high angles of attack. Fluctuations upstream of the wing are found to be mostly broadband with high-frequency humps. The spectra over the wing show the development of a narrow-band peak. A dominant spectral peak occurs upstream, inboard, and outboard of the top of the vertical tails; the dominant frequency is linear with free-stream velocity at a fixed angle of attack. The frequency of the peak and the shape of the spectra change with aircraft angle of attack, with multiple peaks observed at angles of attack above 30 deg.

A92-46782

ESTABLISHING A DATABASE FOR FLIGHT IN THE WAKES OF STRUCTURES

J. V. HEALEY (U.S. Naval Postgraduate School, Monterey, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 559-564. Research supported by U.S. Navy. refs

The NASA Ames 'Shipboard Simulator' seems to have been the sole serious attempt to model flight in the wake of a structure. This simulator is based on a faulty airwake database that was established with a uniform velocity profile and very low turbulence. The present study attempts to correct this situation by making three-dimensional hot-wire anemometer measurements of the airwake properties of a stationary 1/141-scale model ship in a simulated atmospheric boundary layer. The measurements included velocities, turbulence intensities, and spectra at 17 points along typical helicopter glide paths, within one ship-length of the touch down location. These data provide a preliminary single-point database for simulation of helicopter flight in the wake of the real

ship. The results for one path only are presented. In general, the velocities and the root mean square values of their fluctuations decrease as the ship is approached. No correlation is found with the database in the NASA simulator. There is some doubt about the accuracy of certain measurements close to the ship because of very low mean velocities.

Author

A92-46783* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

NAVIER-STOKES PREDICTIONS FOR THE F-18 WING AND FUSELAGE AT LARGE INCIDENCE

RUSSELL M. CUMMINGS, YEHIA M. RIZK, LEWIS B. SCHIFF, and NEAL M. CHADERJIAN (NASA, Ames Research Center, Moffett Field, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 565-574. Previously cited in issue 08, p. 1100, Accession no. A90-22165. refs Copyright

A92-46785

PREDICTION OF INVISCID SUPERSONIC/HYPERSONIC AIRCRAFT FLOWFIELDS

A. VERHOFF and D. STOOKESBERRY (McDonnell Aircraft Co., Saint Louis, MO) (ICAS, Congress, 17th, Stockholm, Sweden, Sept. 9-14, 1990, Proceedings. Vol. 2, p. 1394-1404) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 581-587. Previously cited in issue 09, p. 1309, Accession no. A91-24443. refs

A92-46786* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

NAVIER-STOKES COMPUTATIONS ON SWEPT-TAPERED WINGS, INCLUDING FLEXIBILITY

GURU P. GURUSWAMY (NASA, Ames Research Center, Moffett Field, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 588-597. Previously cited in issue 11, p. 1605, Accession no. A90-29364. refs Copyright

A92-46787* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

EXPERIMENTAL STUDY OF VORTEX FLOWS OVER DELTA WINGS IN WING-ROCK MOTION

T. T. NG, GERALD N. MALCOLM, and LIANE C. LEWIS (Eidetics International, Inc., Torrance, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 598-603. Previously cited in issue 21, p. 3280, Accession no. A89-47648. refs (Contract NAS2-12787)

A92-46790

FLIGHT DECK AERODYNAMICS OF A NONAVIATION SHIP

M. M. RHOADES and J. V. HEALEY (U.S. Naval Postgraduate School, Monterey, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 619-626. Research supported by U.S. Navy. refs

The nature of the flow patterns over the aft flight deck of a typical nonaviation scale-model ship is investigated in a simulated atmospheric boundary layer, and three-dimensional hot-wire measurements of the flow at four points around the locus of a helicopter blade tip are made for six ship yaw angles. Extreme levels of velocity gradients and turbulence intensities are found to exist over the flight deck. The results of the study will be used as a preliminary data base for the analysis of the blade strike problem and comparison with future computational fluid dynamics predictions.

A92-46791* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

PREDICTED PRESSURE DISTRIBUTION ON A PROP-FAN BLADE THROUGH EULER ANALYSIS

MAKOTO KOBAYAKAWA (Kyoto University, Japan), RYOJI TAKAKI (National Aerospace Laboratory, Chofu, Japan), YOSHIFUMI KAWAKAMI (Sumitomo Precision Products, Ltd.,

Amagasaki, Japan), and FREDERICK B. METZGER (Hamilton Standard, Windsor Locks, CT) (ICAS, Congress, 17th, Stockholm, Sweden, Sept. 9-14, 1990, Proceedings. Vol. 2, p. 2073-2081) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 627-631. Research supported by NASA. Previously cited in issue 09, p. 1311, Accession no. A91-24514. refs Copyright

A92-46793

SIMULATION OF TRANSONIC FLOW OVER TWIN-JET TRANSPORT AIRCRAFT

S. RILL and K. BECKER (Deutsche Airbus GmbH, Bremen, Federal Republic of Germany) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 640-646. Previously cited in issue 07, p. 968, Accession no. A91-21342. refs Copyright

A92-46797

DESIGN LOAD PREDICTIONS ON A FIGHTER-LIKE AIRCRAFT WING

S. AGRAWAL, P. J. MALLOY, and D. F. FUGLSANG (McDonnell Douglas Corp., Saint Louis, MO) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 665-670. refs Copyright

Numerical solutions for a transonic design condition have been obtained for a fighterlike aircraft wing geometry using Euler and Navier-Stokes equations. Both rigid and flexible wings are considered. Effects of viscosity and static aeroelasticity on the component loads such as shear, bending moment, and torsion, as well as hinge moments on the flaps and ailerons, are predicted. The flexible wing solutions are obtained by coupling the flow solvers with a simple NASTRAN model. Effects of fuselage and horizontal tail have also been obtained for the rigid wing case using Euler equations. The computed results are compared to available flight test data. It is found that the static aeroelasticity has only a minor role, whereas the effect of viscosity is very pronounced. Comparison with the flight test data is found to be best when viscous effects are included.

A92-46798* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

FOREBODY VORTEX CONTROL USING SMALL, ROTATABLE STRAKES

T. T. NG (Toledo, University, OH) and GERALD N. MALCOLM (Eidetics International, Inc., Torrance, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 671-678. Previously cited in issue 06, p. 800, Accession no. A91-19386. refs

(Contract NAS2-13155) Copyright

A92-46804

UNSTEADY CROSSFLOW ON A DELTA WING USING PARTICLE IMAGE VELOCIMETRY

C. MAGNESS, O. ROBINSON, and D. ROCKWELL (Lehigh University, Bethlehem, PA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 707-709. Research supported by USAF. refs

Copyright

Particle image velocimetry was used to characterize the unsteady flow structure past a pitching delta wing and to identify new features of the flow structure during pitch-up and pitch-down maneuvers. It is shown that the particle image technique makes it possible to identify the instantaneous nature of both the coherent vortical structure and the structure of regions of gross stall on the pitching of a delta wing. The occurrence of these extreme classes of flow structure is linked to the dynamic hysteresis of vortex breakdown location on the wing.

A92-46805

TIME-AVERAGE LOADING ON A TWO-DIMENSIONAL AIRFOIL IN A LARGE AMPLITUDE MOTION

G. M. GRAHAM and M. ISLAM (Ohio University, Athens) Journal

of Aircraft (ISSN '0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 709-712. refs (Contract AF-AFOSR-87-0312)

Copyright

NACA 0015 dynamic section lift data are presented for conditions under which time-average lift values of A(L)=1.5 and above were measured. It is shown, in particular, that most of the dynamic augmentation in lift occurs before flow separation and increases only slightly beyond this point. Consequently, the time-average lift during pull-up displays the same behavior. It lift-force data during the ramp-down motion indicate that for large angles of attack the lift forces are significantly reduced below their ramp-up values. It is also found that the average lift generally increases with pitch rate during ramp-up and decreases during ramp-down.

A92-46808

MINIMIZING SUPERSONIC WAVE DRAG WITH PHYSICAL CONSTRAINTS AT DESIGN AND OFF-DESIGN MACH NUMBERS

JEN-FU CHANG (Aeronautical Research Laboratory, Taichung, Republic of China) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 716-718. refs Copyright

A new computer program has been developed for the design of optimum aircraft area distribution for minimum supersonic wave drag with physical constraints. Being capable of dealing with many physical constraints and providing for a fully automated design process, the program outperforms the Harris code. Wind tunnel data for a conformal tank design demonstrate that the program not only gives the lowest drag throughout the Mach numbers of interest but also meets the objective of least drag increment at the design Mach number.

A92-46811

THIN-AIRFOIL CORRECTION FOR PANEL METHODS

J. CARTER and P. S. JACKSON (Auckland, University, New Zealand) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 723-725. refs Copyright

A simple modification to a conventional panel method is proposed which accounts for the main effect of the singularity appearing at a sharp edge and significantly improves the accuracy. The correction is easily incorporated into standard panel methods without compromising their usual panel and control point configurations. It provides good agreement between the drag force calculated from forces acting directly on the body and those inferred from a lifting line that terminates the wake, thus allowing a simple self-checking procedure for the drag.

A92-46814

WING DESIGN FOR HANG GLIDERS HAVING MINIMUM INDUCED DRAG

TAKESHI SUGIMOTO (Tokyo, University, Japan) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 730, 731. refs

Copyright

The optimum wing design for hang gliders with minimum induced drag is analyzed in the context of lifting line theory. The analysis accounts for the bending moment at the wing root. Optimum solutions are presented.

A92-46816

STATISTICAL PREDICTION OF MAXIMUM BUFFET LOADS ON THE F/A-18 VERTICAL FIN

B. H. K. LEE and S. DUNLAVY (Institute for Aerospace Research, Ottawa, Canada) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 734-736. refs
Copyright

The application of Gumbel's (1954) asymptotic theory of extreme values to the prediction of buffet loads on the vertical fin is discussed. Wind-tunnel examples of peak buffet loads on the F/A-18 vertical fin demonstrate that Gumbel's third asymptotic

distributions accurately predict the extreme values. The short time period of 1.56 s is shown to be sufficient to estimate maximum peak load for long operating times. This approach is particularly useful for testing in blowdown wind tunnels where operating costs can be cut down for short runs.

EFFECT OF A NOSE-BOOM ON FOREBODY VORTEX FLOW

T. T. NG (Toledo, University, OH) Journal of Aircraft (0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 738-741. refs Journal of Aircraft (ISSN

The effect of the nose-boom on the forebody vortex flow was investigated experimentally in a water tunnel using four different models. The wake flow of a nose-boom is found to be similar to that of highly slender cylindrical bodies. The wake consists of symmetric vortices at moderate angles of attack, asymmetric vortices at high angles of attack, and unsteady vortex shedding at very high angles of attack. In most situations, the nose-boom has a dominating effect on the forebody vortex asymmetry. Conditions under which the nose-boom would increase or decrease the zero-sideslip asymmetric sideforce are determined. VΙ

A92-46820

COMMENT ON 'CANARD-WING INTERACTION IN UNSTEADY SUPERSONIC FLOW

ERWIN H. JOHNSON, WILLIAM P. RODDEN (MacNeal-Schwendler Corp., Los Angeles, CA), P. C. CHEN (Zona Technology, Inc., Mesa, AZ), and D. D. LIU (Arizona State University, Tempe) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992. refs Copyright

A92-46882* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

INTERACTION BETWEEN CROSSING OBLIQUE SHOCKS AND A TURBULENT BOUNDARY LAYER

N. NARAYANSWAMI, D. KNIGHT (Rutgers University, Piscataway, NJ), S. M. BOGDONOFF (Princeton University, NJ), and C. C. HORSTMAN (NASA, Ames Research Center, Moffett Field, CA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 1945-1952. Previously cited in issue 06, p. 801, Accession no. A91-19394. refs

(Contract AF-AFOSR-86-0266; AF-AFOSR-89-0033) Copyright

A92-46883

SIMPLIFIED LINEAR STABILITY TRANSITION PREDICTION METHOD FOR SEPARATED BOUNDARY LAYERS

PAOLO DINI (Carleton College, Northfield, MN), MICHAEL S. SELIG, and MARK D. MAUGHMER (Pennsylvania State University, University Park) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 1953-1961. Previously cited in issue 23, p. 4003, Accession no. A91-53785. refs

Copyright

NUMERICAL METHOD FOR PREDICTING TRANSITION IN THREE-DIMENSIONAL FLOWS BY SPATIAL AMPLIFICATION THEORY

TUNCER CEBECI and HSUN H. CHEN (California State University, AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Long Beach) Aug. 1992, p. 1972-1979. Previously cited in issue 17, p. 2851, Accession no. A91-40778. refs Copyright

National Aeronautics and Space Administration. A92-46887* Langley Research Center, Hampton, VA.

TEMPORAL ADAPTIVE EULER/NAVIER-STOKES ALGORITHM INVOLVING UNSTRUCTURED DYNAMIC MESHES

W. L. KLEB, J. T. BATINA (NASA, Langley Research Center, Hampton, VA), and M. H. WILLIAMS (Purdue University, West AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Lafavette, IN) Aug. 1992, p. 1980-1985. Previously cited in issue 16, p. 2486,

Accession no. A90-38778. refs (Contract NAG1-372) Copyright

A92-46889

COMPACT HIGHER ORDER CHARACTERISTIC-BASED EULER SOLVER FOR UNSTRUCTURED GRIDS

D. W. HALT and R. K. AGARWAL (McDonnell Douglas Research Laboratories, Saint Louis, MO) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 1993-1999. Research supported by McDonnell Douglas Corp. Previously cited in issue 23, p. 4000, Accession no. A91-53751. refs Copyright

A92-46890

JOINT COMPUTATIONAL/EXPERIMENTAL AERODYNAMICS RESEARCH ON A HYPERSONIC VEHICLE. I - EXPERIMENTAL

WILLIAM L. OBERKAMPF and DANIEL P. AESCHLIMAN (Sandia National Laboratories, Albuquerque, NM) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2000-2009. Previously cited in issue 07, p. 971, Accession no. A91-21447. refs (Contract DE-AC04-76DP-00789) Copyright

A92-46891

JOINT COMPUTATIONAL/EXPERIMENTAL AERODYNAMICS RESEARCH ON HYPERSONIC VEHICLE. II -COMPUTATIONAL RESULTS

MARY M. WALKER and WILLIAM L. OBERKAMPF (Sandia National Laboratories, Albuquerque, NM) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2010-2016. Previously cited in issue 07, p. 972, Accession no. A91-21458. refs (Contract DE-AC04-76DP-00789) Copyright

A92-46892* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. HYPERSONIC RAREFIED FLOW ABOUT A DELTA WING -DIRECT SIMULATION AND COMPARISON WITH EXPERIMENT M. C. CELENLIGIL (Vigyan Research Associates, Inc., Hampton, VA) and JAMES N. MOSS (NASA, Langley Research Center, AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Hampton, VA) Aug. 1992, p. 2017-2023. Previously cited in issue 18, p. 3050, Accession no. A91-43387. refs Copyright

A92-46894* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PARALLEL COMPUTING STRATEGIES FOR BLOCK MULTIGRID IMPLICIT SOLUTION OF THE EULER EQUATIONS YORAM YADLIN and DAVID A. CAUGHEY (Cornell University, Ithaca, NY) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2032-2038. Research supported by NSF. refs

(Contract NAG2-665) Copyright

A multigrid diagonal implicit algorithm has been developed to solve the three-dimensional Euler equations of inviscid compressible flow on block-structured grids. An improved method of advancing the multigrid cycle has been examined with respect to convergence rates, accuracy, and efficiency. In this method, the multigrid cycle is advanced independently in each of the blocks. and the information exchange between the blocks is done using buffer arrays, allowing for the asynchronous updating of interface boundary conditions. This updating scheme is used to eliminate the convergence problems found in a previous implementation of the algorithm while retaining its potential for efficient parallel execution. Results are computed for transonic flows past wings and include pressure distributions to verify the accuracy of the scheme and convergence histories to demonstrate the efficiency of the method. Efficiencies that were obtained using a modest number of processors in parallel are also presented and discussed. Author

A92-46895

TWO-STREAM, SUPERSONIC, WAKE FLOWFIELD BEHIND A THICK BASE, I - GENERAL FEATURES

V. A. AMATUCCI (Sandia National Laboratories, Albuquerque, NM), J. C. DUTTON (Illinois, University, Urbana), D. W. KUNTZ (Sandia National Laboratories, Albuquerque, NM), and A. L. ADDY (Illinois, AIAA Journal (ISSN 0001-1452), vol. 30, University, Urbana) no. 8, Aug. 1992, p. 2039-2046. Previously cited in issue 08, p. 1105, Accession no. A90-22450, refs (Contract DAAL03-87-K-0010; DAAL03-90-G-0021) Copyright

National Aeronautics and Space Administration, A92-46897* Washington, DC.

COMPUTATION OF TURBULENT, SEPARATED, UNSWEPT COMPRESSION RAMP INTERACTIONS

T. A. MARSHALL and D. S. DOLLING (Texas, University, Austin) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2056-2065. Research supported by NASA and U.S. Navy. refs (Contract AF-AFOSR-86-0112)

Copyright

Examination of the literature shows that the comparison between experiment and computation for highly separated unswept compression ramp flows is generally poor, irrespective of the turbulence model used. In general, the upstream influence is not correct, the wall pressure rise through separation is too steep, and the pressures under the separated shear layer are too high. In the current study, the objective is to determine if these discrepancies might be attributed more to other factors such as flowfield unsteadiness or three-dimensionality, rather than to inadequate turbulence modeling. To examine this possibility, multichannel wall pressure fluctuations were measured under the unsteady separation shock wave in a 28-deg unswept compression ramp flow at Mach 5. The results show that the large scale, low frequency separation shock unsteadiness controls the distribution of time-averaged surface properties and that neglect of the unsteadiness is probably the primary cause of the discrepancy between experiment and computation.

National Aeronautics and Space Administration. A92-46899* Langley Research Center, Hampton, VA. MULTIPLE SHOCK-SHOCK INTERFERENCE ON A

CYLINDRICAL LEADING EDGE

ALLAN R. WIETING (NASA, Langley Research Center, Hampton, AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2073-2079. Previously cited in issue 17, p. 2860, Accession no. A91-42598. refs Copyright

A92-46900

EFFECT OF MODEL COOLING ON PERIODIC TRANSONIC **FLOW**

S. RAGHUNATHAN, F. ZARIFI-RAD (Belfast, Queen's University, Northern Ireland), and D. G. MABEY (Royal Aerospace Establishment, Bedford, England)

AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2080-2086. Previously cited in issue 17, p. 2857, Accession no. A91-42562. refs Copyright

A92-46901

EXPERIMENTAL INVESTIGATION OF THE PARALLEL VORTEX-AIRFOIL INTERACTION AT TRANSONIC SPEEDS

IRAJ M. KALKHORAN (Polytechnic University, Farmingdale, NY) and DONALD R. WILSON (Texas, University, Arlington) Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2087-2092. Previously cited in issue 18, p. 2755, Accession no. A89-42061.

(Contract DAAG29-84-K-0131)

Copyright

A92-46902* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

GORTLER INSTABILITY AND SUPERSONIC QUIET NOZZLE DESIGN

FANG-JENG CHEN (NASA, Langley Research Center, Hampton, VA), MUJEEB R. MALIK (High Technology Corp., Hampton, VA), and IVAN E. BECKWITH (George Washington University, Hampton, VA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2093, 2094. Abridged. Previously cited in issue 16, p. 2484, Accession no. A90-38727, refs Copyright

A92-46903

MEASUREMENT OF SHOCK-WAVE/BOUNDARY-LAYER INTERACTION IN A FREE-PISTON SHOCK TUNNEL

C. H. B. STACEY and J. M. SIMMONS (Queensland, University, AIAA Journal (ISSN 0001-1452), vol. 30, St. Lucia, Australia) no. 8, Aug. 1992, p. 2095-2098. Research supported by Australian Research Grants Scheme. Previously cited in issue 09, p. 1281, Accession no. A89-25374. refs Copyright

A92-46913

OUTFLOW BOUNDARY CONDITIONS USING DUHAMEL'S **EQUATION**

DAVID NIXON (Nielsen Engineering & Research, Inc., Mountain AlAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2156-2158. Abridged. Previously cited in issue 21, p. 3292, Accession no. A90-45937. refs (Contract F49620-88-C-0006) Copyright

A92-46934

THE UNSTEADY INTERACTION OF A 3-DIMENSIONAL **VORTEX FILAMENT WITH A CYLINDER**

H. AFFES and A. T. CONLISK (Ohio State University, Columbus) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandría, VA, American Helicopter Society, 1991, p. 37-1 to 37-11, Research supported by U.S. Army. refs

The interaction of a 3D vortex filament with a cylinder is considered. The problem is a simplified model of the interaction between a tip-vortex shed from a helicopter rotor and the fuselage. The motion of the filament indicates that a strong interaction between the vortex and the cylinder will take place as the vortex approaches the cylinder. Numerical calculations indicate that a large adverse pressure gradient develops under the vortex on the wall causing a rapid drop in the pressure there; large variations in the curvature of the vortex are not observed.

A92-46935* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

A STUDY OF ROTOR WAKE DEVELOPMENT AND WAKE/BODY INTERACTIONS IN HOVER

A. BAGAI, J. G. LEISHMAN, and D. K. SAMAK (Maryland, University, College Park) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 41-1 to 41-17. Research supported by University of Maryland. refs

(Contract DAAL03-88-C-0002; NAG2-607)

Experiments were conducted to document the wake geometry and interactional effects between a hovering rotor and a body representing a simplified helicopter fuselage. The wide-field shadowgraph technique was used to visualize the rotor wake vortices and to obtain quantitative information on the wake trajectories, with and without the presence of the body. Particular attention was paid to visualizing and quantifying the wake geometry during the direct impingement of tip vortices on the body surface. The rotor performance with and without the fuselage is also discussed.

A92-46944

ACTIVE CONTROL OF BLADE VORTEX INTERACTION

J. V. R. PRASAD, T. BOWLES, and D. VANDEKERCKHOVE (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 52-1 to 52-7. refs

During operation, a rotor blade must encounter the vortices of preceding blades. The interaction of an airfoil with a vortex is characterized by a large pressure pulse at the leading edge of the airfoil. This pressure pulse causes the well known 'blade slap' of helicopter rotors in certain flight conditions. This paper investigates the possibility of reducing this pressure pulse with the aid of a flap at the trailing edge of the airfoil. It is shown that with a pressure sensor on the leading edge and a flap at the trailing edge, a feedback control scheme can be formulated to reduce the vortex induced pressure pulse.

A92-46947

INTERACTION BETWEEN A ROTOR TIP VORTEX AND A SEPARATED FLOWFIELD

NARAYANAN M. KOMERATH, JAI-MOO KIM, and SHIUH-GUANG LIOU (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 23-1 to 23-9. refs (Contract DAAL03-88-C-0003) Copyright

The experimental study of separated flow effects in rotorcraft interaction aerodynamics is presently approached by way of a qualitative study of the interaction between the vortex system of a two-bladed rotor in forward flight and an axisymmetric, backward-facing step. Phase-averaged surface pressure measurements are made downstream of the step. The results obtained indicate the presence of natural shear layer oscillations in the absence of the rotor, with a characteristic frequency that is of the same order as the rotor frequency used in later experiments. Under forcing by the rotor flowfield, the free shear layer rolls up around the tip vortex. The effect of blade passage and the suction due to tip-vortex interaction are seen in the pressure signal below the recirculating region.

A92-46948 EXPERIMENTAL AND NUMERICAL STUDY OF FLOW AROUND HELICOPTER ROTOR BLADE TIPS

B. BENCHERIFA and J. MARCILLAT (Institut de Mecanique des Fluides, Marseille, France) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 24-1 to 24-13. Research supported by ONERA. refs

The main results of experimental and numerical studies of flow around blade tips presented emphasize aerodynamic coefficients or limiting flow at a two-surface wall, about new shapes simulated by semispan wings placed in an M=0.6 wind tunnel. Some numerical results obtained through an FIDAP code using a finite element method to solve the Navier-Stokes equations are also presented. Two examples of unsteady, 2D, incompressible viscous flows with separation are presented at 15 and 34 deg, for Re of 1000.

A92-46949

FLOW VISUALISATION OF A SMALL DIAMETER ROTOR OPERATING AT HIGH ROTATIONAL SPEEDS WITH BLADES AT SMALL PITCH ANGLES

OSVALDO M. QUERIN (Sydney, University, Australia) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 25-1 to 25-6. refs

Flow visualization experiments were carried out on a four-bladed model rotor with blades set at low pitch angles. Two flow conditions were investigated, the tip vortices were tracked, and their paths were plotted. Analysis of the wake showed that: (1) rotors with substantial axial flow produce very stable wakes; (2) near-hovering flow conditions produce unstable wakes where the tip vortex coordinates flip between two equilibrium positions at different locations in their paths; and (3) these vortex paths cross each other axially and radially.

Author

A92-46950

A UNIFIED PROCEDURE FOR SOLVING ROTOR FLOWFIELD, PERFORMANCE AND INTERFERENCE

R. G. RAJAGOPALAN (Iowa State University of Science and Technology, Ames) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 26-1 to 26-13. Research supported by Iowa State University of Science and Technology. refs

The performance and global flow characteristics of helicopter rotors and their interference are presently determined by means of a novel finite-difference procedure which treats the flow through the rotor as composed of two regions: that closest to the rotating blades, and that which extends from the outer boundaries of the inner region to the rest of the flowfield, including the far wake. This approach allows different levels of accuracy to be prescribed for the two regions despite their implicit connection. The usefulness of the method is demonstrated by computing the flowfield of a rotor in descent, including the vortex ring state.

A92-46951* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

EFFICIENT HIGH-RESOLUTION ROTOR WAKE

CALCULATIONS USING FLOW FIELD RECONSTRUCTION

TODD R. QUACKENBUSH (Continuum Dynamics, Inc., Princeton, NJ), DONALD B. BLISS (Duke University, Durham, NC), and C. G. LAM (Continuum Dynamics, Inc., Princeton, NJ) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 27-1 to 27-15. refs (Contract NAS1-19023)

Recent computational studies of helicopter flowfields for acoustic applications has led to the development of exceptionally efficient analysis methods for carrying out Lagrangian simulations of the vortex wake. The capabilities of these methods are demonstrated here through calculations involving a variety of wake/rotor interactions associated with both main rotor and tail rotor flowfields. These methods incorporate a flowfield reconstruction approach efficiently to compute vortex wake interactions within arbitrary regions located near the main rotor. This paper summarizes the development of the reconstruction approach and outlines some of its potential uses, while focusing primarily on its application to rotor noise calculations. The development of the nearfield velocity corrections used in the analysis of close vortex interactions is described, and the overall structure of the current reconstruction approach is discussed.

Author

A92-46952* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

AN EULERIAN/LAGRANGIAN METHOD FOR COMPUTING BLADE/VORTEX IMPINGEMENT

JOHN STEINHOFF (Tennessee, University; Flow Analysis, Inc., Tullahoma), HEINRICH SENGE (Tennessee, University, Tullahoma), and WENREN YONGHU (Tennessee, University; Flow Analysis, Inc., Tullahoma) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 28-1 to 28-10. refs (Contract NAS2-13079)

A combined Eulerian/Lagrangian approach to calculating helicopter rotor flows with concentrated vortices is described. The method computes a general evolving vorticity distribution without any significant numerical diffusion. Concentrated vortices can be accurately propagated over long distances on relatively coarse grids with cores only several grid cells wide. The method is demonstrated for a blade/vortex impingement case in 2D and 3D

where a vortex is cut by a rotor blade, and the results are compared to previous 2D calculations involving a fifth-order Navier-Stokes solver on a finer grid.

A92-46953* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

THREE-DIMENSIONAL BLADE VORTEX INTERACTIONS

FARHAD DAVOUDZADEH, RICHARD C. BUGGEIN, STEPHEN J. SHAMROTH (Scientific Research Associates, Inc., Glastonbury, CT), and CAHIT KITAPLIOGLU (NASA, Ames Research Center, Moffett Field, CA) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 29-1 to 29-11. refs (Contract NAS2-12635)

A three-dimensional time dependent Navier-Stokes analysis was applied to the rotor blade vortex interaction problem. The numerical procedure is an iterative implicit procedure using three point central differences to represent spatial derivatives. A series of calculations were made to determine the time steps, pseudo-time steps, iterations, artificial dissipation level, etc. required to maintain a nondissipative vortex. Results show the chosen method to have excellent non-dissipative properties provided the correct parameters are chosen. This study was used to set parameters for both two- and three-dimensional blade vortex interaction studies. The case considered was the interaction between a vortex and a NACA0012 airfoil. The results showed the detailed physics during the interaction including the pressure pulse propagating from the blade. The simulated flow physics was qualitatively similar to that experimentally observed. The BVI phenomena is the result of the buildup and violent collapse of the shock waves and local supersonic pockets on the blade surfaces. The resulting pressure pulse build-up appears to be centered at the blade leading edge.

A92-46954* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

EXPERIMENTAL AND COMPUTATIONAL STUDIES OF HOVERING ROTOR FLOWS

M. NSI MBA (Institut de Mecanique des Fluides, Marseille, France), K. RAMACHANDRAN (Flow Analysis, Inc.; NASA, Ames Research Center, Moffett Field, CA), and F. X. CARADONNA (U.S. Army, Aviation Systems Command; NASA, Ames Research Center, Moffett Field, CA) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 30-1 to 30-17. refs

(Contract DRET-89-1433)

HELIX-I, an essentially standard full-potential CFD helicopter rotor code, is unique in its use of the Clebisch kinematical flow description to specify a freely convecting wake and its capacity for predicting hover performance. A study is presently performed to assess the method's sensitivity to grids and solution-starting techniques. The effects of these parameters on thrust, power, load distribution, and wake geometry are ascertained and compared with an extensive rotor data base. The use of a fairly accurate starting solution yields no obvious advantage over the use of a novel starting method which employs a succession of diminishing artificial flows.

O.C.

A92-46955

NUMERICAL SIMULATION OF MULTIZONE TWO-DIMENSIONAL TRANSONIC FLOWS USING THE FULL NAVIER-STOKES EQUATIONS

J. C. NARRAMORE (Bell Helicopter Textron, Inc., Fort Worth, TX) and L. N. SANKAR (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 31-1 to 31-11. refs

A new aerodynamic tool has been developed that computes the fluid flow characteristics and forces on multielement two-dimensional aerodynamic configurations. The code solves the two-dimensional, compressible, fully Reynolds-average

Navier-Stokes equations in multiple H-grid topology zones and can analyze up to five separate elements. Because it is a Navier-Stokes solver, it can handle high angle-of-attack and Mach number conditions unsuitable for potential flow solvers that historically have been used to evaluate multielement airfoils. Several examples of the application of this code to practical aerodynamic problems are given. This new code provides a significant increase in the analysis capability for complex two-dimensional configurations.

A92-46956

INITIAL VALIDATION OF AN UNSTEADY EULER/NAVIER-STOKES FLOW SOLVER FOR HELICOPTER ROTOR AIRLOADS IN FORWARD FLIGHT

BRIAN E. WAKE and T. A. EGOLF (United Technologies Research Center, East Hartford, CT) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 32-1 to 32-14. refs

An unsteady, three-dimensional, Navier-Stokes/Euler solver (NSR3D) has been applied to a helicopter rotor in forward flight for several advance ratios. For the wake influence, the flow solver is coupled with a lifting-line free-wake method. Unsteady blade loads computed by the solver are compared with experimental data and lifting-line/free-wake results. The three-dimensional analysis, performed on the massively parallel Connection Machine (CM-2), was advanced around the rotor azimuth until a periodic solution was produced. Preliminary Navier-Stokes results have been computed without the wake effects. Unsteady blade loading from the Euler analysis demonstrates relatively good correlation with experimental blade airloads at low speed and fair correlation at higher flight speeds. These results demonstrate the feasibility of a 'Numerical Rotor Test Facility' in the near term.

A92-46957* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

EFFECTS OF LEADING AND TRAILING EDGE FLAPS ON THE AERODYNAMICS OF AIRFOIL/VORTEX INTERACTIONS

AHMED A. HASSAN (McDonnell Douglas Helicopter Co., Mesa, AZ), L. N. SANKAR (Georgia Institute of Technology, Atlanta), and H. TADGHIGHI (McDonnell Douglas Helicopter Co., Mesa, AZ) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 33-1 to 33-14. refs

(Contract NAS1-19136)

A numerical procedure based on the unsteady 2D full potential equation is presently used to simulate the effects of leading-edge and trailing-edge flaps on the aerodynamics of airfoil-vortex interactions. Attention is given to unsteady flap-motion effects, which alleviate those interactions at sub- and supercritical onset flows. For subcritical interactions, the results obtained indicate that trailing-edge flaps can be used to alleviate the impulsive loads experienced by the airfoil; for supercritical interactions, a leading-rather than trailing-edge flap must be used to alleviate the interaction.

O.C.

A92-46958

A NEW INTEGRAL EQUATION FOR POTENTIAL COMPRESSIBLE AERODYNAMICS OF ROTORS IN FORWARD FLIGHT

M. GENNARETTI, O. MACINA, and L. MORINO (Roma I, Universita, Rome, Italy) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 34-1 to 34-8. Research supported by ASI. refs

The Gennaretti (1989) boundary integral equation methodology for the analysis of unsteady, compressible potential flows around helicopter rotors in hover and forward flight was extended by Macina (1990) to the case of arbitrary motion. Novel numerical results have been obtained by these means for isolated rotors in both hover and forward flight. These results were derived through

the application of a zeroth-order boundary-element discretization of the integral equation for the velocity potential.

A92-46959* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AERODYNAMIC PARAMETRIC STUDIES AND SENSITIVITY ANALYSIS FOR ROTOR BLADES IN AXIAL FLIGHT

Y. D. CHIU (Lockheed Engineering and Sciences Co., Hampton, VA) and DAVID A. PETERS (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 35-1 to 35-15. Previously announced in STAR as N91-22078. refs (Contract NAS1-19000)

The analytical capability is offered for aerodynamic parametric studies and sensitivity analyses of rotary wings in axial flight by using a 3D undistorted wake model in curved lifting line theory. The governing equations are solved by both the Multhopp Interpolation technique and the Vortex Lattice method. The singularity from the bound vortices is eliminated through the Hadamard's finite part concept. Good numerical agreement between both analytical methods and finite differences methods are found. Parametric studies were made to assess the effects of several shape variables on aerodynamic loads. It is found, e.g., that a rotor blade with out-of-plane and inplane curvature can theoretically increase lift in the inboard and outboard regions respectively without introducing an additional induced drag.

Author

National Aeronautics and Space Administration. A92-46985*# Langley Research Center, Hampton, VA.

A PARAMETRIC ANALYSIS OF RADIATIVE STRUCTURE IN **AEROBRAKE SHOCK LAYERS**

ROBERT B. GREENDYKE (Vigyan, Inc., Hampton, VA) Plasmadynamics and Lasers Conference, 23rd, Nashville, TN, July 6-8, 1992. 12 p. refs (Contract NAS1-19237) (AIAA PAPER 92-2970)

A broad-spectrum version of the NEQAIR code was modified to account for self-absorption and applied to AFE flowfields calculated by the LAURA code with a variety of kinetic models. The resulting radiative fluxes were obtained in a decoupled fashion from the flowfield solver along the vehicle's stagnation streamline. The radiative flux obtained was broken down by causative process to study the radiative structure of the AFE's flowfield for the various kinetic models. In addition, the radiative fluxes for several points on a typical AFE trajectory were analyzed to examine how the radiative structure changes as the vehicle completes its aeropass. Only two radiative processes dominated the stagnation radiative flux, and the flow field conditions near the wall were found to exert considerable influence over the radiative flux to the wall.

Author

A92-46986*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

DECOUPLED PREDICTIONS OF RADIATIVE HEATING IN AIR USING A PARTICLE SIMULATION METHOD

IAIN D. BOYD and ELLIS E. WHITING (Eloret Institute, Palo Alto; NASA, Ames Research Center, Moffett Field, CA) Plasmadynamics and Lasers Conference, 23rd, Nashville, TN, July 6-8, 1992. 10 p. refs

(Contract NCC2-582)

(AIAA PAPER 92-2971)

A particle simulation technique with decoupled radiation is used to estimate the radiative emission along the stagnation streamline and the radiative heating at the stagnation point of a blunt-nosed vehicle entering the earth's atmosphere at hypersonic speed. The direct simulation Monte Carlo (DSMC) method is used to compute the fluid mechanics of the weakly ionized flow. The radiative emission is computed using the NEQAIR computer code with the radiation decoupled from the flowfield solution. It is concluded that the new models make it possible to decrease the predicted total radiative heating at the stagnation point of the vehicle by a factor of 15. A comparison of the DSMC approach with a continuum flow model shows that the total predicted radiative heating estimates agree within a factor of 2.

A92-47038

MESH ADAPTION FOR 2D TRANSSONIC EULER FLOWS ON **UNSTRUCTURED MESHES**

R. RICHTER and P. LEYLAND (Lausanne, Ecole Polytechnique Federale, Ecublens, Switzerland) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 27-39. refs Copyright

Shock fitting for transonic flows is investigated via successive refinement techniques on unstructured triangular meshes. The relative mesh dependency is also studied using respectively a centered explicit scheme, with artificial viscosity and an upwind, approximate Riemann solver type scheme, without local refinement. A semi-interactive graphics package is incorporated to make a workstation feasibility of such codes. The advantages of unstructured meshes, and their flexibility of localized refinements. retain an optimal solution for a minimal number of mesh points. The first scheme is a standard Jameson type centered scheme with artificial dissipation of second and fourth order, based on a Galerkin approximation on dual control volumes rather than cell vertex ones. The artificial dissipation terms are based on bisegment flux control. The approximate Riemann solver is based on Osher's scheme with implicit time-stepping. Only convergence of steady state is considered here.

A92-47041

MESH ADAPTIVITY WITH THE QUADTREE METHOD

A. EVANS, M. J. MARCHANT, J. SZMELTER, and N. P. WEATHERILL (Swansea, University College, Wales) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 67-78. Research supported by Royal Aerospace Establishment and CEC. Copyright

In this paper, a data structure, loosely based around a quadtree, is introduced and developed to manage an adaptive point enrichment technique for structured quadrilateral meshes. The technique allows the interfaces between enriched regions to be easily detected and transitional interface elements constructed. The approach is applied to the adaptive solution of the inviscid Euler equations for two dimensional transonic flows. Author

A92-47042 National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

UNSTRUCTURED AND ADAPTIVE MESH GENERATION FOR HIGH REYNOLDS NUMBER VISCOUS FLOWS

D. J. MAVRIPLIS (ICASE; NASA, Langley Research Center, Hampton, VA) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 79-91. Previously announced in STAR as N91-20063. refs (Contract RTOP 505-90-52-01; NAS1-18605) Copyright

A method for generating and adaptively refining a highly stretched unstructured mesh suitable for the computation of high-Reynolds-number flows viscous about two-dimensional geometries was developed. The method is based on the Delaunay triangulation of a predetermined set of points and employs a local mapping in order to achieve the high stretching rates required in the boundary-layer and wake regions. The initial mesh-point distribution is determined in a geometry-adaptive manner which clusters points in regions of high curvature and sharp corners. Adaptive mesh refinement is achieved by adding new points in regions of large flow gradients, and locally retriangulating; thus, obviating the need for global mesh

regeneration. Initial and adapted meshes about complex multi-element airfoil geometries are shown and compressible flow solutions are computed on these meshes. Author

National Aeronautics and Space Administration. A92-47045* Langley Research Center, Hampton, VA.

GRID ADAPTATION TO MULTIPLE FUNCTIONS FOR APPLIED **AERODYNAMIC ANALYSIS**

S. P. PAO (NASA, Langley Research Center, Hampton, VA) and KHALED S. ABDOL-HAMID (Analytical Services and Materials, Inc., Hampton, VA) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 119-129. refs

Copyright

A fast and robust method of grid adaptation to multiple functions has been developed for flow analysis in 3D space. It is based on the equidistribution principle and the alternate direction adaptation method. The grid adaptation algorithm has been fully integrated with a space marching flow solver as contained within a 3D Navier-Stokes code and PAB3D-v2. The grid adaptation strategy, details of numerical implementation, examples of application, and potential extensions of the current method are presented in this paper.

A92-47054

SINGLE BLOCK MESH GENERATION FOR A FUSELAGE PLUS TWO LIFTING SURFACES

TIMOTHY J. BAKER (Princeton University, NJ) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland. 1991. p. 261-272. refs

Copyright

A procedure is presented for generating a single block H-H mesh around an aerodynamic configuration consisting of a fuselage plus two lifting surfaces. The lifting surfaces may assume any orientation relative to each other. It is therefore possible to create single block meshes for aircraft shapes that have either a wing and a tail or a wing and a canard. The method uses a sequence of mappings to reduce the configuration to a simple generic shape followed by the interpolation of coordinate surfaces that conform with all boundaries. After reversing the mapping sequence one obtains a single block, boundary conforming mesh in physical space.

A92-47057

GRID SENSITIVITY IN LOW REYNOLDS NUMBER HYPERSONIC CONTINUUM FLOWS

WALTER H. RUTLEDGE (Sandia National Laboratories, Albuquerque, NM) and KLAUS A. HOFFMANN (Wichita State IN: Numerical grid generation in computational University, KS) fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 301-313. Previously announced in STAR as N91-25118. refs

(Contract DE-AC04-76DP-00789)

Copyright

A computational scheme is presented to solve the unsteady Navier-Stokes equations over a blunt body at high altitude, high Mach number atmospheric reentry flow conditions. This continuum approach is directed to low Reynolds/low density hypersonic flows by accounting for non-zero bulk viscosity effects in near frozen flow conditions. A significant difference from previous studies is the inclusion of the capability to model non-zero bulk viscosity effects. The grid definition for these low Reynolds number, viscous dominated flow fields is especially important in terms of numerical stability and accurate heat transfer solutions. Author

A92-47060

MULTI-BLOCK GRID GENERATION AROUND WING-BODY-ENGINE-PYLON CONFIGURATIONS

C.-C. ROSSOW and A. RONZHEIMER (DLR, Institut fuer Entwurfsaerodynamik, Braunschweig, Federal Republic of Germany) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 357-368. refs

An approach for mesh generation of block-structured, body-fitted grids around wing-body-engine-pylon configurations is described. In this approach geometry definition and the calculation of intersection lines is achieved using Coons patches. Point distributions on lines, surface grids, and field grids are mainly obtained by solving a system of Poisson equations. In order to determine the source terms occurring in the Poisson equations the concept of target points has been applied. Together with a proper scaling of the corrections to the source terms during the iterative solution, accurate control of the desired grid properties was achieved, and elliptic field grid generation is performed within a couple of minutes on modern supercomputers. The presented grid generation system provides grids around twin engine transport aircraft configurations for the calculation of inviscid flows. Different types of engines can be treated. Results of the application of an Euler code to the generated meshes are also presented. Author

A92-47061

3-D NUMERICAL GRID GENERATION FOR THE TRANSONIC FLOW ANALYSIS ABOUT MULTI-BODIES

U. GULCAT and H. R. KUL (Istanbul Technical University, Turkey) IN: Numerical grid generation in computational fluid dynamics and related fields, Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 369-375. refs Copyright

An algebraic grid generation scheme suitable for transonic flow analysis about multi-bodies is presented. In the grid generation process the flow domain external to the bodies are divided into blocks and each block is discretized with finite volumes for which the conservation laws are satisfied using Euler's equations. These blocks are matched together in such a way that the Finite Volume Method can handle the slip surfaces properly. The proposed technique is applied to generate a grid around a wing with an external body attached to the wing with a pylon. The numerical results obtained for a 2D flow past the wing section at free stream Mach number of 0.95, to simulate a transonic maneuver, is presented in terms of surface pressure distribution. Author

A92-47064

INTERACTIVE ALGEBRAIC MESH GENERATION FOR TWIN JET TRANSPORT AIRCRAFT

K. BECKER (Deutsche Airbus GmbH, Bremen, Federal Republic of Germany) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 455-466. Research supported by CEC. refs

Copyright

The fundamental elements of the DA mesh generation system INGRID and the Euler solver MELINA are described. The numerical validation experiments show that this system is able to accurately simulate inviscid flow about complex configurations like wing or body mounted engine cases. As INGRID uses only explicit techniques, it is fast enough to be run on a workstation in interactive mode. Thus it provides a flexible and cheap mesh generation facility.

A92-47079

NEW CONCEPTS FOR MULTI-BLOCK GRID GENERATION FOR FLOW DOMAINS AROUND COMPLEX AERODYNAMIC CONFIGURATIONS

S. P. SPEKREYSE, J. W. BOERSTOEL (National Aerospace Laboratory, Amsterdam, Netherlands), and P. L. VITAGLIANO (Alenia S.p.A., Gruppo Aerei da Trasporto, Naples, Italy) Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 719-730. Research supported by Netherlands Agency for Aerospace Programs, Aeritalia, National Aerospace Laboratory, et al. refs Copyright

A multiblock grid generation procedure is described which is suitable for constructing multiblock grids in numerical simulations of flows around complex aerodynamic configurations. Novel aspects of the procedure are its use of topology and geometry of block decomposition specified first by an interactive domain modeler, compound edges and faces, grid embedding, grid lines which are C-deg-continuous only over block faces, and a biharmonic solver for grid generation in faces.

C.D.

A92-47090

GENERATION OF UNSTRUCTURED GRIDS WITHIN A HYBRID MULTI-BLOCK ENVIRONMENT

P. N. CHILDS (Aircraft Research Association, Ltd., Bedford, England) and N. P. WEATHERILL (Swansea, University College, Wales) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 899-911. Research supported by Royal Aerospace Establishment. refs

It is demonstrated how a local region of embedded unstructured grid may be used to extend the range of application of the multiblock approach. It is shown that techniques for surface and field grid generation are amenable to a large degree of automation within the unstructured region. Robust procedures are developed to maintain boundary integrity and to enable structured and unstructured grids to be interfaced.

A92-47096

ORTHOGONAL GRIDS FOR MULTIPLE AIRFOILS

G. MORETTI (GMAF, Inc., Freeport, NY) and F. MARCONI (Grumman Aerospace Corp., Bethpage, NY) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 965-973. refs

Copyright

A technique to generate orthogonal meshes around multiple airfoils (typically, a main airfoil with a flap and a slat) is described. Conformal mappings, based on powers, bilinear equations and a novel interpretation of the Theodorsen technique are used to transform the region outside the three airfoils into seven blocks, each one of which is covered by an orthogonal grid, with coordinate lines running along the boundaries, so that the coordinate lines can be made to match across the seams. The final result is an orthogonal grid of the C-type.

A92-47100

ANALYSIS OF MOTION OF AIRFOIL FLYING OVER WAVY-WALL SURFACE (LIFTING SURFACE METHOD)

SHIGENORI ANDO (Tokushima Bunri University, Japan), TETSU SAKAI, and KYOKO NITTA (Nagoya University, Japan) Japan Society for Aeronautical and Space Sciences, Transactions (ISSN 0549-3811), vol. 35, no. 107, May 1992, p. 27-38. refs

A 2D motion of a thin airfoil flying over and in proximity to a wavy-wall surface in incompressible and inviscid flow is analyzed. The problem is reduced to a version of the lifting surface problem. It is found that about ten times the airfoil chord length may be satisfactory with sufficient margin. Results agree well with those obtained with the finite difference method. Examples of computation are presented for two problems: a forced vibration problem and seaworthiness for a wing-in-ground effect vehicle.

O.G.

A92-47153

A FINITE DIFFERENCE SOLUTION OF THE EULER EQUATIONS ON NON-BODY-FITTED CARTESIAN GRIDS

KOJI MORINISHI (Kyoto Institute of Technology, Matsugasaki,

Japan) (Japan - Soviet Union Joint Symposium on Computational Fluid Dynamics, 2nd, Tsukuba, Japan, Aug. 27-31, 1990) Computers & Fluids (ISSN 0045-7930), vol. 21, no. 3, July 1992, p. 331-344. refs

Copyright

A finite difference solution on non-body-fitted Cartesian grids has been developed for the two-dimensional compressible Euler equations. The solution is based on the method of lines. The spatial derivatives of the Euler equations are first discretized by finite difference approximations on stretched grids. The rational Runge-Kutta scheme is used as the time-stepping scheme. Accurate numerical boundary conditions are introduced at the body surfaces where the coordinate lines do not generally fit the boundaries. A series of numerical experiments are carried out to validate the present solution. Numerical results obtained for transonic flows over single-element airfoils agree well with reliable results obtained for the same flows on body-fitted grids. Typical numerical results are also obtained for transonic flows over bi-NACA0012 airfoils. The present solution is confirmed to be easily tractable even for multielement flowfields. Author

A92-47155

NUMERICAL EXPERIMENTS ON UNSTEADY SHOCK REFLECTION PROCESSES USING THE THIN-LAYER NAVIER-STOKES EQUATIONS

SHIGHERU ASO (Kyushu University, Fukuoka, Japan) and MASANORI HAYASHI (Nishinippon Institute of Technology, Fukuoka, Japan) (Japan - Soviet Union Joint Symposium on Computational Fluid Dynamics, 2nd, Tsukuba, Japan, Aug. 27-31, 1990) Computers & Fluids (ISSN 0045-7930), vol. 21, no. 3, July 1992, p. 369-375. refs

Copyright

Processes of shock reflection by a ramp are simulated by solving the thin-layer Navier-Stokes equations using the TVD scheme in the convective terms. Calculations were performed to study viscous effects in unsteady aerodynamic heating and weak Mach reflections. Unsteady aerodynamic heating due to the impingement and the Mach stem and slip layer in shock reflection at higher Ms values were calculated numerically. In addition, Mach reflections at lower Ms are calculated numerically to investigate the viscous effects on weak shock reflection by a ramp. Significant changes in the reflection patterns with Re were observed.

A92-47684

THE CALCULATION OF THREE-DIMENSIONAL COMPRESSIBLE BOUNDARY LAYER STABILITY ON SWEPT WINGS

DENG-BIN TANG (Nanjing Aeronautical Institute, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A1-A7. In Chinese. refs

The boundary layer stability on swept wings is investigated computationally by using 3D compressible laminar stability theory. For a 3D disturbance wave in a 3D boundary layer, an eigenvalue of an eighth-order system of compressible stability equations is computed by highly efficient correlative two-steps method. The analytical solutions of equations at the outer edge of boundary layers are derived. Examples of the laminar-flow-control wing and the natural-laminar-flow wing are given and used to study typical stability problems of Tollmien-Schlichting type disturbance and crossflow disturbance on the swept wing. The results are quite consistent with available calculations.

A92-47686

THE NUMERICAL SIMULATION OF COMPRESSIBLE FLOW AROUND AN AIRFOIL AT HIGH ANGLE OF ATTACK

FENG LI, YI-YUN WANG, and ER-JIE CUI (Beijing Institute of Aerodynamics, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A17-A22. In Chinese. refs

Compressible flow around an NACA 0012 airfoil at high angle of attack is numerically simulated by solving the 2D Navier-Stokes equations in a body-fitted system. The Baldwin-Lomax turbulent model is used to simulate the formation of the leading edge

separation bubble, the convection of vortex along the airfoil surface, and unsteady phenomena of the vortex at high angle of attack. For some Mach numbers and angles of attack, the NACA 0012 airfoil turbulent solutions are periodic. The results agree with experiments and results obtained by other methods.

A92-47690

A TIME MARCHING METHOD IN FINITE VOLUME FOR TRANSONIC DIFFUSER TURBULENT FLOWS

SHU-CHENG ZHANG and XI-JUN HUANG (Beijing University of Aeronautics and Astronautics, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A42-A47. In Chinese. refs

A time marching method in finite volume is presented and applied to time dependent. Revnolds-averaged Navier-Stokes equations for transonic diffuser turbulent flows. A two-layer algebraic turbulent model, proposed by Baldwin-Lomax is used for the eddy viscosity function. An explicit, two-step time-marching method is presented. In the predicting step, downwind difference is used in the streamwise direction and central difference in the transverse direction. In the correcting step, upwind difference in the streamwise direction and central difference in the transverse direction are applied. The method is first-order in time and second-order in space. The results of the calculation are in good agreement with experiments. Author

A92-47691

A NEW METHOD FOR PREDICTING THE END WALL **BOUNDARY LAYERS AND THE BLADE FORCE DEFECTS** INSIDE THE PASSAGE OF AXIAL COMPRESSOR CASCADES HU WU, FU-QUN CHEN, SONG-LING LIU, and ZHI-TAO HUANG (Northwestern Polytechnical University, Xian, People's Republic of

China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A48-A56. In Chinese. refs

A new method is presented for calculating the end-wall boundary layers and the blade force defects inside the passage of axial compressor cascades based on associating boundary layer theory with secondary flow analysis. An integral equation of the boundary layer is used to calculate the longitudinal flow. Two layers of velocity modes are established to predict the transverse flow. An elliptic outer layer transverse flow associated with the secondary vorticity is computed by using the differential method. The calculation is performed inside the cascade passage and conducted alternatively between the longitudinal flow and the transverse flow. The S-type transverse flow profiles are predicted automatically and accurately. Compared with experimental results, the predictions by this method show better agreement for two examples of heavily loaded cascades. It is apparent that this method is both practical and reliable. The bases are established for predicting the end wall boundary layers in multistage axial compressors.

A92-47694

AN IMPROVED MULTIPLE LINE-VORTEX METHOD FOR SIMULATION OF SEPARATED VORTICES OF SLENDER

WEN-HAI GUO (Chinese Academy of Sciences, Institute of Mechanics, Beijing, People's Republic of China), DING-DING XING. and FENG-GAN ZHUANG (Beijing University of Aeronautics and Astronautics, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A87-A90. In Chinese. refs

An improved vortical lines method has been made to simulate separated vortices slender wings. The idea of the method is to merge free vortical lines into cores so that chaotic motion of vortical lines can be avoided. The strength and position of vortical cores and lines can iteratively be obtained by satisfying boundary conditions. Numerical results show that the convergent quality of the method is good. The results are basically consistent with experimental results. The vortical flow of slender wings can be satisfactorily simulated by the method. Author

A92-47695

AERODYNAMIC SENSITIVITIES FOR SUBSONIC LIFTING-SURFACE

MING-CHU XU and WEN-YING GU (Northwestern Polytechnical University, Xian, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A91-A95. In Chinese. refs

The aerodynamic sensitivity for a subsonic lifting-surface with an arbitrary curved leading edge is evaluated by the kernal function method. The expression of the generalized force coefficients and the corresponding sensitivity derivatives are derived into very concise forms by means of an appropriate series representation for load distribution and the calculation of upwash velocity in the Trefftz plane. Illustrative calculations for the elliptic, rectangular, and sweptback wings show that the force coefficient result of the sensitivity derivative method is actually identical to that of the direct kernel function method within the accuracy of lifting-surface theory. The partial derivatives obtained hereby can be used for multidisciplinary optimization by decomposition for aircraft design.

A92-47782

TOTAL LOSSES IN TURBULENT FLOWS INSIDE CONICAL DIFFUSERS (STRATY CALKOWITE PRZEPLYWU TURBULENTNEGO W DYFUZORACH STOZKOWYCH]

KRZYSZTOF J. JESIONEK (Wrocław Technical University, Poland) and ARKADII E. ZARIANKIN (Moskovskii Energeticheskii Institut, Politechnika Slaska, Zeszyty Naukowe, Moscow, Russia) Mechanika (ISSN 0434-0817), no. 107, 1992, p. 173-180. In

A method of calculation of a diffuser flow boundary layer is presented that ensures a high concurrence of theoretical results with experimental investigation findings. A general equation is given, and an adequate detailed expression for the conical diffusers is obtained. The presented method does not require the use of additional, experimental correction coefficients. Author

A92-47839#

CALCULATION OF HYPERSONIC, VISCOUS. NON-EQUILIBRIUM FLOWS AROUND REENTRY BODIES USING A COUPLED BOUNDARY LAYER/EULER METHOD

CH. MUNDT (MBB GmbH, Munich, Federal Republic of Germany) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 15 p. refs (AIAA PAPER 92-2856) Copyright

The objective of the present paper is to present a new and efficient method for the calculation of hypersonic, viscous flows in chemical nonequilibrium. The solution is obtained by using a coupled second order boundary layer/Euler method, thus making it possible to account for important hypersonic effects, such as entropy layer swallowing. Applications are presented for two-dimensional flow fields to validate the method and to analyze various physical and chemical effects. As a three-dimensional application, flows past the nose of the Hermes vehicle are calculated, and show suitability of the method for these applications is demonstrated. Author

A92-47856#

COMPUTATION OF HYPERSONIC FLOWFIELDS IN THERMAL AND CHEMICAL NONEQUILIBRIUM

ESWAR JOSYULA and JOSEPH S. SHANG (USAF, Wright Laboratory, Wright-Patterson AFB, OH) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 15 p. refs (AIAA PAPER 92-2874) Copyright

Hypersonic flows past hemisphere cylinders at zero incidence in chemical and thermal nonequilibrium are investigated for a range of Mach numbers from 10 to 18. The numerical code is successfully validated for surface pressure and heat transfer prediction with recent experiments conducted in a shock tunnel. The numerical code is also successfully validated for stagnation point heat flux predictions at altitudes of 22 km and 37 km with a set of earlier experiments. Numerical solutions with the vibrational equilibrium are compared with those of multi-temperature

nonequilibrium. The stagnation point heat transfer is 10 to 23 percent higher for the nonequilibrium solutions in the Mach number range of 12 to 18. The importance of a multi-temperature model for accurate prediction of stagnation properties, particularly the heat transfer, is noted. The variation in computed shock-standoff distance substantiates that the Mach number independence principle applicable to ideal gases does not hold for dissociating flows. Over the range of Mach numbers, the noticeable influence of vibrational relaxation on the temperature distributions and mass concentrations in the vicinity of shocks is shown in the present study.

A92-47858#

COMPUTATION OF 3-D HYPERSONIC FLOWS IN CHEMICAL NON-EQUILIBRIUM INCLUDING TRANSPORT PHENOMENA

S. MENNE, C. WEILAND, and M. PFITZNER (MBB GmbH, Munich, Federal Republic of Germany) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-2876) Copyright

An algorithm for the simulation of 3D hypersonic flows in chemical nonequilibrium is presented. The basic flow solver is based on a quasi-conservative formulation of the Euler or Navier-Stokes equations. The Jacobi matrices are split according to the sign of their eigenvalues. The derivatives of the conservative variables are split accordingly. A third-order upwind space discretization is used in conjunction with an optimized three-stage Runge-Kutta explicit time stepping scheme. The chemistry source terms are treated point-implicitly. For inviscid flow, the code is applied to the complete HERMES 1.0 configuration. The influence of mesh resolution is studied by comparing a fine grid with a coarse grid solution. For viscous flow, the flow about generic configurations (double-ellipse, hemisphere-cylinder-flare, hyperbolaflare) is investigated by performing grid sensitivity studies as well as by comparing different transport models.

A92-47860#

NUMERICAL SIMULATION OF CHEMICAL AND THERMAL NONEQUILIBRIUM FLOWS BEHIND COMPRESSION SHOCKS

G. BRENNER and U. PRINZ (DLR, Institut fuer Theoretische Stroemungsmechanik, Goettingen, Federal Republic of Germany) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by DFG and CNES. refs (AIAA PAPER 92-2879) Copyright

In this paper the influence of the thermal and chemical relaxation on the flow behind the bow shock of blunt and pointed bodies is investigated. Several models using different descriptions for high-temperature nitrogen and air are used. Special attention is payed to the influence of the modeling of nonequilibrium effects on surface heat fluxes and other properties of engineering interest. To shed some light on the relaxation behind shock/shock and shock/boundary layer interactions, as they occur, e.g., at the body-elevon junction of hypersonic vehicles, the flow past an axisymmetric approximation of the windward side of a generic Hermes geometry with body flap is simulated. The numerical method used in this investigation is a finite-difference upwind-TVD scheme. For comparison, alternative numerical methods were used to verify the present results.

A92-47872*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

LAMINAR HYPERSONIC FLOW OVER A COMPRESSION USING THE HANA CODE

JOHN F. FAY (Sverdrup Technology, Inc., Huntsville, AL) and JAY SAMBAMURTHI (NASA, Marshall Space Flight Center, Huntsville, AL) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 12 p. refs (Contract NAS8-37814)

(AIAA PAPER 92-2896) Copyright

A hypersonic blunt-body code, HANA (Hypersonic Analysis for Aerobrakes), has been used to model the flow with compression corner angles of 15 and 24 degrees. A comparison is made between experimental flow data and numerical results of previous

investigations which include surface pressures, skin friction coefficients, heat transfer rates, and flow field geometries. O.G.

A92-47873*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ENHANCEMENTS TO VISCOUS-SHOCK-LAYER TECHNIQUE

ROOP N. GUPTA (NASA, Langley Research Center, Hampton, VA), KAM-PUI LEE (Vigyan, Inc., Hampton, VA), and ERNEST V. ZOBY (NASA, Langley Research Center, Hampton, VA) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 16 p. refs

(AIAA PAPER 92-2897) Copyright

A solution procedure is presented which considerably improves the computational efficiency of the viscous-shock-layer technique, especially for long slender bodies. The 'predictor-corrector' procedure suggested for obtaining the shock shape beyond the nose region requires only a single global pass. The accuracy of the present method is demonstrated by comparison with globally iterated results over the entire body and with ground- and flight-test data. A good comparison of the results computed with the two methods is shown for different flowfield chemistry models and axisymmetric body shapes. The new procedure results in computer run times 1/3 to 1/2 of the times required for the full-body global iteration procedure. Further, the algebraic expressions used to specify the initial shock shape eliminate the need for a shock shape generated by external means and permit immediate introduction of the full viscous-shock-layer equations. Finally, the present method of solution for the VSL equations provides to the aerothermal designer a very efficient and accurate tool for detailed flowfield as well as future technology studies. Author

A92-47875#

LOW DENSITY HEAT TRANSFER PHENOMENA

K. S. NAGARAJA (USAF, Wright Laboratory, Wright-Patterson AFB, OH) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-2899)

A molecular flow equation (BGK equation) is applied to the classical Rayleigh problem to evaluate the transition characteristics between free molecule and continuum flows. Data obtained show that the heat transfer reaches a peak at a Knudsen number which is within the range of transition flow conditions under which similar peaks had been observed in limited wind tunnel tests. In the near continuum domain, even a slight variation in the flow Knudsen number causes an appreciable change in the heat transfer. Noncontinuum approaches are considered to be imperative for understanding performances of certain hypersonic vehicles at high altitudes.

A92-47876#

NUMERICAL AND EXPERIMENTAL INVESTIGATION OF RAREFIED COMPRESSION CORNER FLOW

A. CHPOUN, J. C. LENGRAND, and K. S. HEFFNER (CNRS, Laboratoire d'Aerothermique, Meudon, France) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 12 p. refs

(Contract DRET-89-080)

(AIAA PAPER 92-2900) Copyright

This paper presents the results of an experimental and numerical work carried out at the Laboratoire d'Aerothermique du CNRS, in order to investigate a rarefied hypersonic flow over a compression corner at two levels of rarefaction. The numerical work consisted of calculations of the flow by both the continuum model (Navier-Stokes (NS) full equations + wall temperature jump and velocity slip) and the DSMC method. In the experimental work, the density field over the model was measured by the electron-beam fluorescence technique in the SR3-CNRS rarefied hypersonic wind tunnel. The heat flux of the wall was also measured by thin skin technique. The principal aim of the work is to discuss the ability and the accuracy of the continuum model (NS) for the resolution of such rarefied flows by comparing results with different approaches.

A92-47892*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HEAT TRANSFER CHARACTERISTICS OF HYPERSONIC WAVERIDERS WITH AN EMPHASIS ON LEADING EDGE

DENIS O. VANMOL and JOHN D. ANDERSON, JR. (Maryland, University, College Park) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 16 p. refs (Contract NAG1-1192)

(AIAA PAPER 92-2920) Copyright

The present analysis of the heat-transfer characteristics of a family of viscous-optimized, 60 m-long waverider hypersonic vehicles gives attention to the transition from laminar to turbulent flow, and to how the transition affects aerodynamic heating distributions over the waverider surface. Two different constant-dynamic-pressure flight trajectories are considered, at 0.2 and 1.0 freestream atmospheres. For Mach numbers below 10, it is found that passive radiative cooling of the surface is sufficient. The degree of leading-edge bluntness required by aerodynamic heating constraints does not significantly degrade the aerodynamic performance of these waveriders.

National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

SOLUTION OF THE BURNETT EQUATIONS FOR HYPERSONIC FLOWS NEAR THE CONTINUUM LIMIT

SCOTT T. IMLAY (Amtec Engineering, Inc., Bellevue, WA) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 11 p. refs

(Contract NAS8-38892)

(AIAA PAPER 92-2922) Copyright

The INCA code, a three-dimensional Navier-Stokes code for analysis of hypersonic flowfields, was modified to analyze the lower reaches of the continuum transition regime, where the Navier-Stokes equations become inaccurate and Monte Carlo methods become too computationally expensive. two-dimensional Burnett equations and the three-dimensional rotational energy transport equation were added to the code and one- and two-dimensional calculations were performed. For the structure of normal shock waves, the Burnett equations give consistently better results than Navier-Stokes equations and compare reasonably well with Monte Carlo methods. For two-dimensional flow of Nitrogen past a circular cylinder the Burnett equations predict the total drag reasonably well. Care must be taken, however, not to exceed the range of validity of the Burnett equations.

A92-47915*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CHARACTERISTICS OF THE SHUTTLE ORBITER LEESIDE FLOW DURING A REENTRY CONDITION

WILLIAM L. KLEB and K. J. WEILMUENSTER (NASA, Langley Research Center, Hampton, VA) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 15 p. refs (AIAA PAPER 92-2951) Copyright

A study of the leeside flow characteristics of the Shuttle Orbiter is presented for a reentry flight condition. The flow is computed using a point-implicit, finite-volume scheme known as the Langley Aerothermodynamic Upwind Relaxation Algorithm (LAURA). LAURA is a second-order accurate, laminar Navier-Stokes solver, incorporating finite-rate chemistry with a radiative equilibrium wall temperature distribution and finite-rate wall catalysis. The resulting computational solution is analyzed in terms of salient flow features and the surface quantities are compared with flight data. Author

A92-47917#

AEROTHERMODYNAMIC CALCULATIONS FOR THE SPACE SHUTTLE ORBITER

J. HAEUSER, J. MUYLAERT, H. WONG, M. SPEL (ESTEC, Noordwijk, Netherlands), and T. VOIRON (CNES, Evry, France) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 20 p. refs (AIAA PAPER 92-2953) Copyright

Euler and Navier-Stokes computations have been performed for two different geometries, namely, the original Space Shuttle and a European version of Orbiter, using mono- and multiblock grids. Effects of varying Mach number and real gas effects were simulated using Euler solutions based on a monoblock grid. Both models showed that the main contribution of the real gas effect on the pitching moment originated from the expansion part on the windward side of Orbiter. The specific heat ratio was parametrically varied in a series of perfect gas computations which demonstrated the feasibility of using cold facilities for pitch-up sensitivity investigations. Multiblock grids are used for both Euler and Navier-Stoke solutions. The multiblock topology lead to a substantially reduced number of grid points. A comparison of the aerodynamic coefficients obtained by the two approaches shows that small differences in the nose region can be attributed to the grid singularity of the monoblock grid.

SOME EXACT AND NUMERICAL RESULTS FOR PLANE STEADY SHEARED FLOW OF AN INCOMPRESSIBLE **INVISCID FLUID**

TERRY BROCKETT and JUNG-CHUN SUH (Michigan, University, Ann Arbor) Fluid Dynamics Research (ISSN 0169-5983), vol. 10, no. 1, June 1992, p. 55-73. refs

Analytical and numerical solutions are given for the steady flow of an inviscid fluid about symmetric lifting profiles at an angle of attack in a plane sheared onset flow for which conformal mapping plays a critical role. For uniform shear in two dimensions, the disturbance field is potential and a solution based on the conformal transformation technique may therefore be constructed. The data obtained indicate that the uniform-shear solution overpredicts the lift and surface speed on the suction side of the foil relative to the more realistic onset flow. The numerical solution predicts surface speeds which generally lie between those for the uniform flow and the uniformly sheared flow solutions.

A92-48207

EXPERIENCE WITH THE JOHNSON-KING TURBULENCE MODEL IN A TRANSONIC TURBINE CASCADE FLOW

N. B. WOOD (National Power Technology and Environmental Centre, Leatherhead, England) International Journal of Heat and Fluid Flow (ISSN 0142-727X), vol. 12, no. 2, June 1991, p. 158-165, refs

Copyright

Experience is described of the application of the Dawes Navier-Stokes solver to a turbine test case involving shock-boundary-layer interaction. Modifying the implementation of the algebraic eddy-viscosity turbulence model gave improved agreement between the predictions and the experimental results. In order to improve the predictions still further, the nonequilibrium turbulence model of Johnson and King was incorporated into the code. This gave limited further improvement in the overall loss prediction, but the base pressure prediction was not improved. Only a minor shock-induced separation was predicted, compared with the increasing major separation observed in cascade tests with increasing outlet Mach number. Better prediction of the test flow may require the incorporation of higher-order turbulence models, in which the physics of the flow is more fully represented. Additionally, three-dimensional and unsteady capability may be needed.

A92-48577

CALCULATION OF FULLY THREE-DIMENSIONAL SEPARATED FLOWS WITH AN UNSTEADY VISCOUS-INVISCID INTERACTION METHOD

J. C. LE BALLEUR and P. GIRODROUX-LAVIGNE (ONERA. Chatillon, France) (International Symposium on Numerical and Physical Aspects of Aerodynamic Flows, 5th, California State University, Long Beach, CA, Jan. 13-15, 1992) ONERA, TP no. 1992-1, 1992, 15 p. Research supported by Ministere de la

Defense. refs (ONERA, TP NO. 1992-1)

This paper presents a fully 3D time-consistent turbulent viscous-inviscid interaction technique, based on a marching thin-layer 3D-numerical method that switches locally a direct or inverse mode of solution, on a modeling of parametric 3D-turbulent velocity profiles, and on the 'semiimplicit' unsteady coupling algorithm, extended in 3D-flows. 3D turbulent separations are shown to be accessible to the calculation techniques based on viscous-inviscid interaction. The shock-induced 3D-separation on rectangular wings is successfully computed, with standard grids, properly refined in chord but not in span.

SEPARATION AND VORTEX FORMATION IN TURBULENT FLOWS

JEAN M. DELERY (ONERA, Chatillon, France) (Caribbean Conference on Fluid Dynamics, 2nd, University of the West Indies, St. Augustine, Trinidad and Tobago, Jan. 5-8, 1992) ONERA, TP no. 1992-7, 1992, 10 p. Research supported by CNES and Ministere de la Defense. refs (ONERA, TP NO. 1992-7)

A separation process in 3D flows and the formation of vortical structures were analyzed using the critical-point theory. The latter makes it possible to correctly interpret the surface flow patterns which constitute the imprints of the outer flow and to give a rational and coherent description of the vortical system generated by separation.

A92-48585

THE DESIGN AND TESTING OF AN AIRFOIL WITH HYBRID LAMINAR FLOW CONTROL

J. RENEAUX and A. BLANCHARD (ONERA, Chatillon, France) (European Forum on Laminar Flow Technology, 1st, Hamburg, Federal Republic of Germany, Mar. 16-18, 1992) ONERA, TP no. 1992-22, 1992, 12 p. Research supported by Direction Generale de l'Aviation Civile, Ministere de la Defense, and Airbus Industrie.

(ONERA, TP NO. 1992-22)

This study focuses on the design of an airfoil with hybrid laminar flow control and describes the performance of a wing employing this basic airfoil. Three tests on this airfoil were conducted in the ONERA-CERT T2 cryogenic wind tunnel. It is shown that the laminization of the upper surface alone will result in a 5.6 percent reduction in fuel consumption which is sufficient to permit the use of a high lift leading edge such as a Kreuger flap.

A92-48701#

ADVANCED CFD SIMULATION AND TESTING OF COMPRESSOR BLADING IN THE MULTISTAGE

FREDERIC FALCHETTI (SNECMA, Moissy-Cramayel, France) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. Research supported by Service Technique des Programmes Aeronautiques and DRET. refs

(AIAA PAPER 92-3040) Copyright

An account is given of an experimental program conducted to investigate the flow behavior of the four rear stages of a high-speed compressor, with attention to the use of miniature transverse probes in conjunction with laser anemometry. A CFD study is then conducted of the 3D viscous effects encountered. The 3D Navier-Stokes solver used in the compressor's design methodology is shown to be a critically important tool in turbomachine aerodynamics. Expected improvements in high pressure compressor design as a result of this work are noted. O.C.

A92-48702# NUMERICAL COMPUTATIONS OF TRANSONIC FLOWS THROUGH CASCADES

A. TERLIZZI, P. DI MARTINO, S. COLANTUONI (Alfa Romeo Avio S.p.A., Pomigliano d'Arco, Italy), and F. BASSI (Milano, Politecnico, AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p.

(AIAA PAPER 92-3041) Copyright

A Navier-Stokes solver is described for 2D turbomachinery flows characterized by two features well suited for application in the design of modern turbine bladings: (1) it uses an adaptive mesh embedding technique to improve locally the accuracy of the numerical solution; and (2) it can simulate fluid injection at specified locations along the blade surface. Computational results are presented to show the flexibility of the proposed mesh-embedding technique applied to 2D turbine cascades and the capability of the code to describe the aerodynamic features of the coolant injection. Author

A92-48703#

COMPARISON BETWEEN TWO 3D-NS-CODES AND **EXPERIMENT ON A TURBINE STATOR**

D. WEGENER (DLR, Cologne, Federal Republic of Germany), A. LE MEUR, G. BILLONNET, B. ESCANDE, and C. JOURDEN (ONERA, Chatillon, France) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. Research supported by DRET. refs (AIAA PAPER 92-3042) Copyright

The object of this paper is to present a comparison between two calculations carried out with different 3D Navier-Stokes codes applied to a subsonic turbine stator. Additionally the numerical data will be validated to experimental data obtained in the annular turbine test rig at DLR. The confrontation between experimental data and the results of the two calculations focus on local distributions and averaged radial distributions of flow angle. Mach number and total pressure ratio. These quantities will be studied in four planes downstream of the stator. The development of the wake and the prediction of total pressure losses will be discussed.

A92-48704#

A HIGHER-ORDER ACCURATE NAVIER-STOKES SOLVER FOR TRANSONIC AND SUPERSONIC FLOWS IN TURROMACHINERY

SATORU YAMAMOTO and HISAAKI DAIGUJI (Tohoku University, Sendai, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p.

(Contract MOESC-03238202; MOESC-02452114; MOESC-03750110)

(AIAA PAPER 92-3044) Copyright

A higher-order Navier-Stokes solver is presented which is based on a compact MUSCL TVD finite-difference scheme with fourth-order accuracy in space and second-order accuracy in time. Shocks, weak discontinuities, and vortices can be captured through this scheme more accurately than through the existing TVD scheme. Numerical results indicate that the proposed solver has a capability of simulating the flow which has never been estimated yet by the existing solver for turbomachinery. The dramatic improvement of the resolution for shocks, vortices and their interactions is remarkable for the Navier-Stokes solver which will be developed in future to analyze complex flow in advanced turbomachinery. OG

A92-48705#

APPLICATION OF NON-REFLECTING BOUNDARY CONDITIONS TO THREE-DIMENSIONAL EULER EQUATION **CALCULATIONS FOR THICK STRUT CASCADES**

IMANARI and **HIDEKAZU KODAMA** (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3045) Copyright

In the present paper, three-dimensional non-reflecting boundary conditions regarding pressure waves and associated components in density and velocity waves have been formulated and applied to time-marching Euler equation calculations of steady flows around uncambered thick strut cascades. The linearized solutions including a Fourier-Bessel double expansion with an exponential variation in the axial direction have been developed for far-field perturbations from the uniform free stream with subsonic axial velocity in a cylindrical annular duct, and used to provide the information for the correction of boundary conditions. Numerical examples for the symmetric struts and the nonuniform strut cascades comprising two types of vanes have demonstrated the correctness and accuracy of the present method, allowing a considerable reduction of the computational domain.

A92-48720# ESTABLISHING TWO-DIMENSIONAL FLOW IN A LARGE-SCALE PLANAR TURBINE CASCADE

P. RODGER, S. A. SJOLANDER (Carleton University, Ottawa, Canada), and S. H. MOUSTAPHA (Pratt & Whitney Canada, Longueuil) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. Research supported by NSERC. refs (AIAA PAPER 92-3066) Copyright

A novel arrangement of endplates has been developed for controlling the flow convergence or divergence in a low-speed cascade test section. These endplates have been used to investigate the influence of the flow two-dimensionality on the midspan aerodynamic behavior of a turbine cascade. It appears that flow convergence has relatively less influence on the midspan losses than flow divergence. However, the observed deviation at the trailing edge was significantly influenced by both. Convergence or divergence appears to alter the blade aerodynamic behavior mainly through its effect on the pressure distribution on the rearward part of the blade, particularly the base pressure. The apparent influence on the base pressure suggests that transonic and other cascades with large trailing edge losses may be particularly sensitive to lack of two-dimensionality.

A92-48723*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

DEVELOPMENT OF AN EFFICIENT ANALYSIS FOR HIGH REYNOLDS NUMBER INVISCID/VISCID INTERACTIONS IN CASCADES

M. BARNETT, J. M. VERDON, and T. C. AYER (United Technologies Research Center, East Hartford, CT) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 15 p. refs (Contract NAS3-25425)

(AIAA PAPER 92-3073) Copyright

An efficient steady analysis for predicting strong inviscid/viscid interaction phenomena such as viscous-layer separation, shock/boundary-layer interaction, and trailing-edge/near-wake interaction in turbomachinery blade passages is described. It uses an inviscid/viscid interaction approach, wherein the flow in the outer inviscid region is assumed to be potential, and that in the inner or viscous-layer region is governed by Prandtl's equations. The inviscid solution is determined using an implicit, least-squares, finite-difference approximation. The viscous-layer solution is obtained using an inverse, finite-difference, space-marching method which is applied along the blade surfaces and the wake streamline. A semiinverse global iteration procedure permits the prediction of boundary-layer separation and other strong-interaction phenomena. Results are presented for two cascades where a range of inlet flow conditions was considered for one of them including conditions leading to large-scale flow separation. Author

A92-48724*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

AIRFOIL WAKE AND LINEAR THEORY GUST RESPONSE INCLUDING SUB AND SUPERRESONANT FLOW CONDITIONS GREGORY H. HENDERSON and SANFORD FLEETER (Purdue University, West Lafayette, IN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by NASA. refs (AIAA PAPER 92-3074) Copyright

The unsteady aerodynamic gust response of a high solidity stator vane row is examined in terms of the fundamental gust modeling assumptions with particular attention given to the effects near an acoustic resonance. A series of experiments was performed with gusts generated by rotors comprised of perforated plates and airfoils. It is concluded that, for both the perforated plate and airfoil wake generated gusts, the unsteady pressure responses do not agree with the linear-theory gust predictions near an acoustic resonance. The effects of the acoustic resonance phenomena are clearly evident on the airfoil surface unsteady pressure responses. The transition of the measured lift coefficients across the acoustic resonance from the subresonant regime to the superresonant regime occurs in a simple linear fashion.

A92-48729*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH. A FAST, UNCOUPLED, COMPRESSIBLE, TWO-DIMENSIONAL,

A FAST, UNCOUPLED, COMPRESSIBLE, TWO-DIMENSIONAL, UNSTEADY BOUNDARY LAYER ALGORITHM WITH SEPARATION FOR ENGINE INLETS

ROBERT L. ROACH, CHRIS NELSON (Georgia Institute of Technology, Atlanta), BARBARA SAKOWSKI, DOUGLAS DARLING (NASA, Lewis Research Center, Cleveland, OH), and ALLAN G. VAN DE WALL (Case Western Reserve University, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. Previously announced in STAR as N92-27653. refs (AIAA PAPER 92-3082) Copyright

A finite difference boundary layer algorithm was developed to model viscous effects when an inviscid core flow solution is given. This algorithm solved each boundary layer equation separately, then iterated to find a solution. Solving the boundary layer equations sequentially was 2.4 to 4.0 times faster than solving the boundary layer equations simultaneously. This algorithm used a modified Baldwin-Lomax turbulence model, a weighted average of forward and backward differencing of the pressure gradient, and a backward sweep of the pressure. With these modifications, the boundary layer algorithm was able to model flows with and without separation. The number of grid points used in the boundary layer algorithm affected the stability of the algorithm affected the stability of the algorithm as well as the accuracy of the predictions of friction coefficients and momentum thicknesses. Results of this boundary layer algorithm compared well with experimental observations of friction coefficients and momentum thicknesses. In addition, when used interactively with an inviscid flow algorithm, this boundary layer algorithm corrected for viscous effects to give a good match with experimental observations for pressures in a supersonic inlet. Author

A92-48730*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

INTERFACE OF AN UNCOUPLED BOUNDARY LAYER ALGORITHM WITH AN INVISCID CORE FLOW ALGORITHM FOR UNSTEADY SUPERSONIC ENGINE INLETS

DOUGLAS DARLING and BARBARA SAKOWSKI (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. Previously announced in STAR as N92-27037. refs

(AIAA PAPER 92-3083) Copyright

An uncoupled boundary layer algorithm was combined with an inviscid core flow algorithm to model flows within supersonic engine inlets. The inviscid flow algorithm that was used was the LArge Perturbation INIet Code (LAPIN). The boundary layer and inviscid core flow algorithms were formulated in different manners. The boundary layer algorithm was two dimensional and solved in nonconservation form, while the core flow algorithm was one dimensional and solved in conservation form. In order to interface the two codes, the following modifications were important. The coordinate system was set up to maintain the parabolic nature of the boundary layer algorithm while approaching the one dimensional core flow solution far from a wall. The pressure gradient used in the boundary layer equation was calculated using the core flow values and the boundary layer equations, so the boundary layer solution smoothly approached the core flow values far from the wall. Flaring was used for the advection terms perpendicular to

the core flow to maintain the stability of the algorithm. With these modifications, the combined viscous/inviscid algorithm matched well experimental observations of pressure distributions with a supersonic inlet.

A92-48738*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

AERODYNAMIC PERFORMANCE OF A FULL-SCALE LIFTING EJECTOR SYSTEM IN A STOVL FIGHTER AIRCRAFT

BRIAN E. SMITH (NASA, Ames Research Center, Moffett Field, CA), DOUG GARLAND (de Havilland Canada, Toronto), and WILLIAM A. POPPEN (General Dynamics Corp., Fort Worth, TX) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 21 p. refs (AIAA PAPER 92-3094) Copyright

The aerodynamic characteristics of an advanced lifting ejector system incorporated into a full-scale, powered, fighter aircraft model were measured at statically and at transition airspeeds in the 40by 80- and 80- by 120-Foot Wind Tunnels at NASA-Ames. The ejector system was installed in an ejector-lift/vectored thrust STOVL (Short Take-Off Vertical Landing) fighter aircraft configuration. Ejector thrust augmentation ratios approaching 1.6 were demonstrated during static testing. Changes in the internal aerodynamics and exit flow conditions of the ejector ducts are presented for a variety of wind-off and forward-flight test conditions. Wind-on test results indicate a small decrease in ejector performance and increase in exit flow nonuniformity with forward speed. Simulated ejector start-up at high speed, nose-up attitudes caused only small effects on overall vehicle forces and moments despite the fact that the ejector inlet flow was found to induce large regions of negative pressure on the upper surface of the wing apex adjacent to the inlets.

A92-48740# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

COMPARATIVE STUDY OF TURBULENCE MODELS IN PREDICTING HYPERSONIC INLET FLOWS

KAMLESH KAPOOR, BERNHARD H. ANDERSON, and ROBERT J. SHAW (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 17 p. Previously announced in STAR as N92-28102. refs (Contract RTOP 505-62-40)

(AIAA PAPER 92-3098) Copyright

A numerical study was conducted to analyze the performance of different turbulence models when applied to the hypersonic NASA P8 inlet. Computational results from the PARC2D code, which solves the full two-dimensional Reynolds-averaged Navier-Stokes equation, were compared with experimental data. The zero-equation models considered for the study were the Baldwin-Lomax model, the Thomas model, and a combination of the Baldwin-Lomax and Thomas models; the two-equation models considered were the Chien model, the Speziale model (both low Reynolds number), and the Launder and Spalding model (high Reynolds number). The Thomas model performed best among the zero-equation models, and predicted good pressure distributions. The Chien and Speziale models compared wery well with the experimental data, and performed better than the Thomas model near the walls.

A92-48741*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTERNAL SHOCK INTERACTIONS IN

PROPULSION/AIRFRAME INTEGRATED

THREE-DIMENSIONAL SIDEWALL COMPRESSION SCRAMJET INLETS

SCOTT D. HOLLAND (North Carolina State University, Raleigh; NASA, Langley Research Center, Hampton, VA) and JOHN N. PERKINS (North Carolina State University, Raleigh) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs (Contract NCC1-153)

(AIAA PAPER 92-3099) Copyright

The advantages and design requirements of propulsion/airframe integration for high Mach number flight are studied in terms of the 3D sidewall compression scramjet inlet. The present work addresses in a parametric fashion the inviscid effects of leading edge sweep, sidewall compression, and inflow Mach number on the internal shock structure in terms of inlet compression and mass capture. The source of the Mach number invariance with leading edge sweep for a constant sidewall compression class of inlet is identified, and a previously undocumented spillage phenomenon in a constant effective wedge angle class of inlets is discussed.

A92-48742#

FNS ANALYSIS OF AN AXISYMMETRIC SCRAMJET INLET

Y.-C. HSIA (Rockwell International Corp., Rocketdyne Div., Canoga Park, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs

(Contract F33657-91-C-2012)

(AIAA PAPER 92-3100) Copyright

A full Navier-Stokes computation was carried out on a mixed-compression axisymmetric scramjet inlet at Mach 5. The geometry including a blunt nose and cowl leading edge was modeled using a multi-zone approach which permitted running either time-marching or space-marching on individual zones. A Baldwin-Lomax turbulence model was used to simulate the effects of turbulence. The flow solution agreed very well with test data on the wall static pressure and throat total pressure. The numerical inlet performance calculated by post-processing the solution matched the wind tunnel test data as well.

Author

A92-48744*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

COMPUTATIONAL ANALYSIS OF RAMJET ENGINE INLET INTERACTION

BEVERLY DUNCAN (Sverdrup Technology, Inc., Brook Park, OH) and SCOTT THOMAS (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3102) Copyright

A computational analysis of a ramjet engine at Mach 3.5 has been conducted and compared to results obtained experimentally. This study focuses on the behavior of the inlet both with and without combustor backpressure. Increased backpressure results in separation of the body side boundary layer and a resultant static pressure rise in the inlet throat region. The computational results compare well with the experimental data for static pressure distribution through the engine, inlet throat flow profiles, and mass capture. The computational analysis slightly underpredicts the thickness of the engine body surface boundary layer and the extent of the interaction caused by backpressure; however, the interaction is observed at approximately the same level of backpressure both experimentally and computationally. This study demonstrates the ability of two different Navier-Stokes codes, namely RPLUS and PARC, to calculate the flow features of this ramjet engine and to provide more detailed information on the process of inlet interaction and unstart.

A92-48800#

WAKE MIXING AND PERFORMANCE MEASUREMENTS IN A LINEAR COMPRESSOR CASCADE WITH CRENULATED TRAILING EDGES

S. J. DECOOK, P. I. KING, and W. C. ELROD (USAF, Institute of Technology, Wright-Patterson AFB, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3188)

Trailing edge crenulations have been shown to enhance velocity recovery (wake dissipation) and to decrease total pressure losses in the blade wakes downstream of a low-aspect-ratio linear compressor cascade. A new study was performed to determine the influence of trailing edge crenulations on outlet flow in the presence of varied inlet flow conditions. Two levels of inlet flow

turbulence intensity (about 0.15 and 3 percent were combined with sidewall boundary layer removal at the cascade inlet (on or off) to provide four test conditions. Testing included configurations with unmodified blades, blades with large crenulations, and blades with small crenulations. For each test condition a reduction of 10 to 20 percent in velocity variance (enhanced wake mixing) and in total pressure loss was observed in the outlet flow with the crenulated blades, while a slight decrease in turning angle was also observed.

A92-48804# NUMERICAL INVESTIGATION OF SURGE AND ROTATING STALL IN MULTISTAGE AXIAL COMPRESSORS

H. ISHII and Y. KASHIWABARA (Hitachi, Ltd., Mechanical Engineering Research Laboratory, Ibaraki, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs (AIAA PAPER 92-3193) Copyright

This paper investigates the effects of various parameters on the inception and post-stall characteristics of surge and rotating stall in multistage axial compressors by using a proposed numerical model. The parameters include the shape of the total pressure-loss and deviation angle characteristics, IGV outlet flow angle, inlet flow distortion, and bleeding. Some of the major findings are: there exist two types of rotating stall differing in magnitude; inlet distortion and the deterioration in compressor performance lower the inception margin of unstable behaviors; an optimal bleeding can exist to make the inception margin of unstable behaviors optimal. The usefulness of the present model is examined by the numerical investigations. The validity of the model is also discussed by comparisons with test results in a 3-stage compressor.

A92-48817# NUMERICAL SOLUTIONS OF UNSTEADY OSCILLATING FLOWS PAST AN AIRFOIL

KOJI MORINISHI and SHIGERU MURATA (Kyoto Institute of Technology, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs

(AIAA PAPER 92-3212) Copyright

The numerical solutions of the incompressible Navier-Stokes equations are used to investigate the unsteady oscillating flows past an airfoil. The time accurate solutions of the Navier-Stokes equations are obtained by the method of artificial compressibility. The rational Runge-Kutta scheme is used for subiterations in the pseudotime. The convergences in the subiterations are accelerated by a multigrid algorithm. Sinusoidally oscillating flows are superimposed on uniform free streams. The Reynolds number and angle of attack of the uniform flows are fixed at 1000 and 15 deg, respectively. The reduced amplitude of the superimposed flows ranges from 5 to 20 percent of the uniform flow velocities, while the reduced frequencies are close to harmonies of the free vortex shedding frequency. The time histories of the lift coefficients are analyzed by means of a spectral analysis. The time histories of the lift coefficients at the small amplitude of the forced flows, oscillate at the forced frequency combined with the free vortex shedding frequency. The time histories at the larger forced amplitude oscillate at the forced frequency.

A92-48857#

THE ENHANCEMENT OF MIXING IN HIGH-SPEED HEATED JETS USING A COUNTERFLOWING NOZZLE

P. J. STRYKOWSKI (Minnesota, University, Minneapolis), A. KROTHAPALLI (Florida State University, Tallahassee), and D. WISHART (Florida Agricultural and Mechanical University, Tallahassee) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs

(Contract N00014-92-J-1406)

(AIAA PAPER 92-3262) Copyright

An experimental study was conducted to determine whether annular counterflow could be used to enhance mixing in high-speed subsonic and supersonic jets. Suction was applied to a collar placed concentrically about the main jet nozzle to establish a reverse flowing stream around the jet periphery. The main jet was operated at exit Mach numbers between 0.4 and 2, for stagnation temperatures from 20 C to 400 C. The results indicate that moderate levels of counterflow can be effectively used to enhance jet mixing under realistic operating conditions. Furthermore, the data suggest that the counterflowing technique becomes more effective as the jet temperature is increased.

A92-48897#

NAVIER-STOKES INVESTIGATION OF A TRANSONIC CENTRIFUGAL COMPRESSOR STAGE USING AN ALGEBRAIC REYNOLDS STRESS MODEL

R. F. KUNZ and B. LAKSHMINARAYANA (Pennsylvania State University, University Park) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 18 p. refs

(Contract DAAL03-86-G-0044)

(AIAA PAPER 92-3311) Copyright

A 3D Navier-Stokes procedure is presently used to arrive at flow field behavior results that are compared with extant laser two-focus meridional passage velocity measurements. A two-layer k-epsilon/algebraic Reynolds stress model is used to account for Reynolds-stress anisotropies. Relative helicity is used to clarify computational results and deepen insight into the secondary motions due to tip-clearance, curvature, and rotation. Results are presented for impeller-diffuser flowfield calculations with and without the two-layer model; good agreement with experimental meridional velocity and shroud static pressure measurements are obtained by both modeling approaches.

A92-48898#

A TURBULENCE MODEL BASED ON RNG FOR QUASI-THREE-DIMENSIONAL CASCADE FLOWS

G. V. HOBSON and C.-W. WANG (U.S. Naval Postgraduate School, Monterey, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs

(AIAA PAPER 92-3312) Copyright

Use of the algebraic renormalization group turbulence model is presented in a quasi-three-dimensional rotor viscous code. An initial baseline solution for an annular turbine cascade was established. The solutions obtained with the existing Baldwin-Lomax turbulence model and the RNG model are compared with available experimental data. The RNG model predictions need to be compared to experimentally measured skin friction data of a boundary layer undergoing transition from laminar to turbulent flow.

A92-48899#

A NAVIER-STOKES ANALYSIS OF A CONTROLLED-DIFFUSION COMPRESSOR CASCADE AT INCREASING INLET-FLOW ANGLES

GARTH V. HOBSON (U.S. Naval Postgraduate School, Monterey, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 15 p. refs (AIAA PAPER 92-3313) Copyright

The extensive set of experimental data, which was measured primarily for code validation, was used for comparison with a finite volume, incompressible Navier-Stokes solution of the viscous flow through a set of controlled-diffusion compressor blades. This was done at increasing inlet-flow angles, and the solution was optimized for the design inlet-flow angle. The main objective of this paper is to predict the losses through the cascade; however, another objective is to predict the turbulence field upstream, through and aft of the blade row. Excellent comparisons were achieved at design incidence; however, at increasing flow angles the losses were not accurately predicted with the code.

A92-48906#

VANE-BLADE INTERACTION IN A TRANSONIC TURBINE. I - AERODYNAMICS

K. V. RAO, R. A. DELANEY (General Motors Corp., Allison Gas

Turbine Div., Indianapolis, IN), and M. G. DUNN (Calspan Advanced Technology Center, Buffalo, NY) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs

(Contract F33615-90-C-2028)

(AIAA PAPER 92-3323)

Part I of this paper presents results of a computational investigation of the effects of blade row interaction on the aerodynamics of a transonic turbine stage. The predictions are obtained using a 2D unsteady Navier-Stokes code based on an explicit Runge-Kutta algorithm and a new O-H grid system. This code simulates the flow in time-accurate fashion using nonreflective stage inflow and outflow boundary conditions and phase-lagging procedures for modeling arbitrary airfoil counts in the vane and blade rows. The O-H grid provides high spatial resolution of the high gradient regions near the airfoil surfaces and allows for arbitrary placement of stage inflow and outflow boundaries. Unsteady and time-averaged airfoil surface pressure predictions are compared with those from an older version of the code based on the explicit hopscotch algorithm and an O-grid system and experimental data obtained in a short-duration shock tunnel facility.

A92-48909*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

INVESTIGATION OF THREE-DIMENSIONAL FLOW FIELD IN A TURBINE INCLUDING ROTOR/STATOR INTERACTION. II - THREE-DIMENSIONAL FLOW FIELD AT THE EXIT OF THE NOZZLE

M. ZACCARIA and B. LAKSHMINARAYANA (Pennsylvania State University, University Park) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs (Contract NSG-3555)

(AIAA PAPER 92-3326) Copyright

The nozzle exit flowfield was measured at two axial locations with a miniature five-hole probe. Measurements were taken from hub-to-tip, blade-to-blade at 21 radial locations and at two axial locations downstream of the nozzle trailing edge to resolve the flowfield accurately including the nozzle wake, secondary flow region, horseshoe vortex and losses. All three components of the velocity, stagnation pressure, static pressure, and pitch and yaw angles have been resolved very accurately. The wake data seems to indicate that the decay of the wake is faster than the wake of an isolated nozzle row. The cause of this is attributed to the presence of the rotor downstream. A distinct vortex core has been observed near the tip. The indications are that the horseshoe vortex and the passage vortex have merged to produce a single loss core region. Roughly a third of the blade height passage near the tip and a third of the blade height near the hub is dominated by secondary flow, passage vortex and the horseshoe vortex phenomena. Only the middle third of the nozzle behaves as per design. These and other data are presented, interpreted and synthesized to understand the nozzle flowfield. Author

A92-49063*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

SUPERSONIC JET MIXING ENHANCEMENT BY 'DELTA-TABS' K. B. M. Q. ZAMAN (NASA, Lewis Research Center, Cleveland, OH), M. F. REEDER, and M. SAMIMY (Ohio State University, Columbus) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 15 p. Previously announced in STAR as N92-24958. refs (AIAA PAPER 92-3548) Copyright

The results of a continuing investigation of the effect of vortex generators, in the form of small tabs at the nozzle exit, on the evolution of a jet are reported. Primarily, tabs of triangular shape are considered, and the effect is studied up to an equivalent jet Mach number of 1.8. By changing the orientation of the tab with respect to the nozzle exit plane, streamwise vortex pairs of opposite sign were generated. This resulted in either an outward selection of jet core fluid into the ambient or an inward indentation of the mixing layer into the core of the jet. A triangular shaped tab with

its apex leaning downstream, referred to as a delta tab, was found to be the most effective in influencing the jet evolution. Two delta tabs, spaced 180 degrees apart, completely bifurcated the jet. Four delta tabs increased jet mixing substantially, more than by various other methods tried previously; the mass flux at fourteen jet diameters downstream from the nozzle increased by about 50 percent over that for the no tab case. The tabs were found to be effective in jets with laminar or turbulent boundary layers as well as in jets with low or high core turbulence intensities.

A92-49076#

IMPROVED METHOD FOR ESTIMATION OF THE MAXIMUM INSTANTANEOUS DISTORTION VALUES

D. W. LIANG and S. Y. ZHANG (Nanjing Aeronautical Institute, People's Republic of China) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs

(AlaA PAPER 92-3623) Copyright

In this paper, the statistical method for estimating the maximum instantaneous distortion in the Liang and Zhang (1989) method is developed further to estimate the maximum values of the instantaneous distortions in which the operation of peak values of dynamic pressure and correlation between them are involved. The effects of the correlation between fluctuating pressures on the estimation are discussed. Comparison between the estimated values and the experimental results shows that the newly developed method can quite accurately estimate the maximum value of the instantaneous distortion with operation of peak values of dynamic pressures involved, such as the distortion descriptor DC (theta). The accuracy of estimation of maximum instantaneous distortion can be improved by considering the correlation between fluctuation pressures, yet when the mean correlation coefficients is less than 0.1, the estimation can be effected by dispensing with correlation.

A92-49088#

NUMERICAL SIMULATION OF A CONFINED TRANSONIC NORMAL SHOCK WAVE/TURBULENT BOUNDARY LAYER INTERACTION

EDWIN BLOSCH, BRUCE F. CARROLL (Florida, University, Gainesville), and MARTIN J. MORRIS (McDonnell Douglas Research Laboratories, Saint Louis, MO) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. Research supported by McDonnell Douglas Independent Research and Development Program and DOE. refs

(AIAA PAPER 92-3668) Copyright

A steady, 2D, Mach 1.48 normal shock wave/turbulent boundary layer interaction (NSTBLI) has been simulated in a diffuser configuration. Particular attention is given to the role of the various parameters affecting the global features of NSTBLIs. Wall static pressure and displacement thickness distributions, and contours of the streamwise component of velocity, are compared with the experiment. The computed interaction is found to be stiffer than the experimental one in the sense that the upstream influence length is smaller, and the wall pressure is steeper; otherwise the agreement with experimental data is good. The simulation results provide some insight into the effect of the pressure gradient on the recovering boundary layer and provide a starting point for an investigation of the effect of local suction in the interaction region.

A92-49118#

NUMERICAL FLOW SIMULATION AND ANALYSIS OF A SHROUDED PROPFAN ROTOR

A. MELAKE (DLR, Institut fuer Antriebstechnik, Cologne, Federal Republic of Germany) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs

(AIAA PAPER 92-3773) Copyright

Propfan concepts are approaches toward fan engines with very high bypass ratio and therefore reduced specific fuel consumption. One of these concepts is the Counter Rotating Integrated Shrouded

Propfan (CRISP) with its swept variable-pitch blades. A comprehensive test program has been performed on the isolated first rotor of the CRISP, accompanied by numerical flow simulation using a 3D Navier-Stokes code. After having validated the code by comparison with experimental data, attention was given to the blade/hub corner and blade/casing corner surfaces at off-design operating condition. These are areas where vortices originate but are difficult to access experimentally. To check the validity of the code with respect to boundary-layer separation, an annular compressor cascade has been used and presented for which an extensive experimental data base was available.

A92-49188 SIMILARITY RELATIONS FOR CALCULATING THREE-DIMENSIONAL CHEMICALLY NONEQUILIBRIUM VISCOUS FLOWS [SOOTNOSHENIIA PODOBIIA DLIA RASCHETA TREKHMERNYKH KHIMICHESKI NERAVNOVESNYKH VIAZKIKH TECHENII]

I. G. BRYKINA, V. V. RUSAKOV, and V. G. SHCHERBAK (Moskovskii Gosudarstvennyi Universitet, Moscow, Russia) Teplofizika Vysokikh Temperatur (ISSN 0040-3644), vol. 30, no. 3, May-June 1992, p. 521-528. In Russian. refs Copyright

Three-dimensional hypersonic flow of a chemically nonequilibrium viscous gas past blunt bodies is investigated analytically. A method for solving three-dimensional flow problems using two-dimensional solutions is proposed which is applicable for arbitrary Reynolds numbers and real gas properties. The method employs similarity ralations describing heat flux, friction, and component concentrations on the surface of an axisymmetric body. The accuracy of the similarity relations is estimated from finite difference calculations of three-dimensional equations of a viscous shock layer for bodies of different shapes moving along a gliding reentry trajectory. Various model of the surface catalytic activity are examined.

N92-28477*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

CALCULATION OF UNSTEADY TRANSONIC FLOWS WITH MILD SEPARATION BY VISCOUS-INVISCID INTERACTION

JAMES T. HOWLETT Jun. 1992 39 p (Contract RTOP 509-10-02-03)

(NASA-TP-3197; L-16996; NAŚ 1.60:3197) Avail: CASI HC A03/MF A01

This paper presents a method for calculating viscous effects in two- and three-dimensional unsteady transonic flow fields. An integral boundary-layer method for turbulent viscous flow is coupled with the transonic small-disturbance potential equation in a quasi-steady manner. The viscous effects are modeled with Green's lag-entrainment equations for attached flow and an inverse boundary-layer method for flows that involve mild separation. The boundary-layer method is used stripwise to approximate three-dimensional effects. Applications are given two-dimensional airfoils, aileron buzz, and a wing planform. Comparisons with inviscid calculations, other viscous calculation methods, and experimental data are presented. The results demonstrate that the present technique can economically and accurately calculate unsteady transonic flow fields that have viscous-inviscid interactions with mild flow separation. Author

N92-28511*# Maryland Univ., College Park. Dept. of Aerospace Engineering.

STUDIES IN GENERAL AVIATION AERODYNAMICS Final Technical Report

ALLEN E. WINKELMANN 1990 20 p (Contract NAG1-681)

(NASA-CR-190431; NAS 1.26:190431) Avail: CASI HC A03/MF A01

The Department of Aerospace Engineering at the University of Maryland has completed a research study for NASA Langley on the application of drooped leading edges to high aspect wings. The experimental study conducted for this grant was a natural extension of work previously conducted at NASA Ames, the

University of Michigan, NASA Langley and the University of Maryland. Previous research had shown that wing planform modifications (commonly referred to as drooped leading edge mods) could have a significant effect on reducing or eliminating the stall/spin characteristics of General Aviation (GA) aircraft. All aircraft studied in the earlier work had relatively low aspect ratio wings (AR = 6). Since future GA aircraft will feature higher aspect ratio wings, the obvious question was: how well will the dropped leading edge work on higher aspect ratio wings? The focus of the current study was to examine the effectiveness of the drooped leading edge modifications to higher aspect ratio wings with AR = 9 to 12.

N92-28657# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

ANALYSIS OF RESULTS OF AN EULER-EQUATION METHOD APPLIED TO LEADING-EDGE VORTEX FLOW

J. I. VANDENBERG, H. W. M. HOEIJMAKERS, and J. M. J. W. JACOBS 30 Oct. 1990 17 p Presented at the AGARD Fluid Dynamics Panel Symposium on Vortex Flow Aerodynamics, Scheveningen, Netherlands, 1-4 Oct. 1990 Previously announced as N92-13000 Sponsored by Netherlands Agency for Aerospace Programs

(NLR-TP-90368-U; ETN-92-91450) Avail: CASI HC A03/MF A01

The flow about a 65 deg sharp edged cropped delta wing with and without an underwing body is simulated by solving the Euler equations. Results are presented for the wing body configuration at a transonic free stream Mach number at incidences ranging from 10 to 20 deg for which in the flow field above the wing a strong vortex develops as well as shocks for the high incidence of 20 deg. Results for subsonic to transonic free stream Mach numbers at high incidence are obtained for the wing alone configuration for which, in the presence of a strong vortex, at transonic free stream Mach number, shocks appear in the solution. For the wing-body configuration, the computational results are compared with experimental data, and the solution in the near wake is investigated.

N92-28658# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

COMPÁRISON OF LDA AND LTA APPLICATIONS FOR PROPELLER TESTS IN WIND TUNNELS

J. H. M. GOODEN and J. W. KOOI 7 May 1988 10 p Presented at the 4th International Symposium on Applications of Laser Anemometry to Fluid Mechanics, Lisbon, Portugal, 11-14 Jul. 1988 Previously announced in IAA as A89-33381 (Contract NIVR-03601-N)

(NLR-MP-88031-U; ETN-92-91512) Avail: CASI HC A02/MF A01 A study to investigate the performance of a two component Laser Doppler (LDA) and Laser Transit (LTA) Anemometer is presented. Both systems were compared under industrial testing conditions in the flow field of a propeller. Free stream flow speed was 40 m/s. The propeller, diameter 0.73 m, was operated at 3500 and 6000 rpm. Axial and tangential velocities were measured in front of, in between and behind the propeller blades. The results of the two systems were in good agreement within 1 m/s for the axial velocity. The error in the tangential velocity was about 1 to 2 m/s but of a different sign. The productivity and the capability of the LDA to measure in highly turbulent flows were superior. The high light concentration in the probe volumes of the LTA made artificial seeding superfluous.

N92-28659# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

CALCULATION OF UNSTEADY SUBSONIC AND SUPERSONIC FLOW ABOUT OSCILLATING WINGS AND BODIES BY NEW PANEL METHODS

M. H. L. HOUNJET 14 Apr. 1989 24 p Presented at the European Forum on Aeroelasticity and Structural Dynamics, Aachen, Fed. Republic of Germany, 17-19 Apr. 1989 Previously announced in IAA as A90-33359 Sponsored in part by Royal Netherlands Air Force

(NLR-TP-89119-U; ETN-92-91518) Avail: CASI HC A03/MF A01

The unsteady aerodynamic loads in the subsonic and supersonic domain, obtained with two new panel methods, for lifting surfaces and for realistic aircraft configurations are presented. The General Unsteady Lifting (GUL) surface code and the Compressible Aerodynamic Response (CAR) methods were developed for calculations involving realistic aircraft configurations. A description of the methods is given. Results are presented and comparisons are made with results of existing methods and with experimental data for a fighter type wing with external stores.

N92-28660# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

CONSTRAINED SPANLOAD OPTIMIZATION FOR MINIMUM DRAG OF MULTI-LIFTING-SURFACE CONFIGURATIONS

R. F. VANDENDAM 10 Apr. 1989 19 p Presented at the AGARD Specialists Meeting on Computational Methods for Aerodynamic Design (Inverse) and Optimization, Loen, Norway, 22-23 May 1989

(Contract NIVR-01101-N)

(NLR-TP-89126-U; ETN-92-91519) Avail: CASI HC A03/MF A01

The development of a interactive computer program system that can be used in aircraft drag minimization studies is addressed. It comprises algorithms for choosing the spanwise distributions of lift, pitching moment, chord and thickness to chord ratio of lifting elements. The choices are optimal in that they minimize induced plus viscous drag while satisfying constraints of aerodynamic, flight mechanical and structural natures. The configurations that can be dealt with may consist of a number of segments representing, for instance, wings or parts of wings, horizontal tails or canards, winglets, flaprail-fairings, etc. Also the interaction between propellers and lifting elements may be included in the procedure. The induced drag is computed using the Trefftz plane integral (farfield analysis), while the viscous drag follows from form factor methods. Novel mathematical formulations of the constrained optimization problems based on the calculus of variations are used. The method was integrated in an infrastructure that allows the capabilities of the method to be efficiently exploited in a multidisciplinary environment. The theoretical models and methods underlying the analysis and optimization capability, comparisons with other theories, information aspects, and some examples of applications are presented.

N92-28674*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

EXPERIMENTAL AND COMPUTATIONAL ICE SHAPES AND RESULTING DRAG INCREASE FOR A NACA 0012 AIRFOIL

JAIWON SHIN and THOMAS H. BOND Jan. 1992 12 p Presented at the 5th Symposium on Numerical and Physical Aspects of Aerodynamic Flows, Long Beach, CA, 13-16 Jan. 1992; sponsored in part by California State Univ.

(Contract RTOP 505-68-10)

(NASA-TM-105743; E-7148; NAS 1.15:105743) Avail: CASI HC

Tests were conducted in the Icing Research Tunnel (IRT) at LeRC to document the repeatability of the ice shape over the range of temperatures varying from -15 to 28 F. Measurements of drag increase due to the ice accretion were also made. The ice shape and drag coefficient data, with varying total temperatures at two different airspeeds, were compared with the computational predictions. The calculations were made with the 2D LEWICE/IBL code which is a combined code of LEWICE and the interactive boundary layer method developed for iced airfoils. Comparisons show good agreement with the experimental data in ice shapes. The calculations show the ability of the code to predict drag increases as the ice shape changes from a rime shape to a glaze shape.

N92-28692# National Aerospace Lab., Amsterdam (Netherlands). Aerodynamics Div.

DEVELOPMENT AND VALIDATION OF A CHARACTERISTIC BOUNDARY CONDITION FOR A CELL-CENTERED EULER METHOD

J. I. VANDENBERG and J. W. BOERSTOEL 6 May 1990 12 p

Presented at the 17th ICAS Congress, Stockholm, Sweden, 9-14 Sep. 1990 Sponsored in part by Netherlands Agency for Aerospace Programs

(NLR-TP-90144-U; ETN-92-91535) Avail: CASI HC A03/MF A01

The development and numerical validation of a solid wall boundary condition for the numerical solution of the Euler equations with a cell centered central difference scheme is presented. This solid wall boundary condition was obtained from the theory of characteristics, and was also formulated for a cell/centered central/difference scheme. The boundary condition was developed to clarify the question of what the effect is of various boundary/condition algorithms on the accuracy of the three dimensional numerical solution of the Euler equations. The numerical validation of the solid/wall boundary condition consists of a comparison of results obtained with the conventional and the new solid/wall boundary condition. Discretization and convergence errors as well as grid depency of the solution were investigated. As a test case, the NLR 7301 airfoil was chosen. Calculations were performed for the supercritical, shock free flow at M(sub infinity) = 0.721, alpha = 0.194 deg, and for a flow with a strong shock at M(sub infinity) = 0.70, alpha 2.0 deg.

N92-28696*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

RESULTS OF A LOW POWER ICE PROTECTION SYSTEM TEST AND A NEW METHOD OF IMAGING DATA ANALYSIS

JAIWON SHIN, THOMAS H. BOND, and GEERT A. MESANDER (Air Force Logistics Command, Tinker AFB, OK.) Jun. 1992 18 p Presented at the 48th Annual Forum and Technology Display, Washington, DC, 3-5 Jun. 1992; sponsored in part by the American Helicopter Society

(Contract RTOP 505-68-10)

(NASA-TM-105745; E-6930; NAS 1.15:105745) Avail: CASI HC A03/MF A01

Tests were conducted on a BF Goodrich De-Icing System's Pneumatic Impulse Ice Protection (PIIP) system in the NASA Lewis Icing Research Tunnel (IRT). Characterization studies were done on shed ice particle size by changing the input pressure and cycling time of the PIIP de-icer. The shed ice particle size was quantified using a newly developed image software package. The tests were conducted on a 1.83 m (6 ft) span, 0.53 m (221 in) chord NACA 0012 airfoil operated at a 4 degree angle of attack. The IRT test conditions were a -6.7 C (20 F) glaze ice, and a -20 C (-4 F) rime ice. The ice shedding events were recorded with a high speed video system. A detailed description of the image processing package and the results generated from this analytical tool are presented.

N92-28709# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

WAVE DRAG DETERMINATION IN THE TRANSONIC FULL-POTENTIAL FLOW CODE MATRICS

J. VANDERVOOREN and A. J. VANDERWEES 19 Feb. 1990

(Contract NIVR-RB-311.1-01501-N)

(NLR-TP-90062-U; ETN-92-91530) Avail: CASI HC A03/MF A01

The mathematical background of a method developed to calculate wave drag in transonic potential flow is described. The method is a generalization and extension of Garabedian's and McFadden's idea of determining wave drag by volume integration of the artificial viscosity. The generalization of Garabedian's and McFadden's idea involves the introduction of a reference artificial viscosity which provides a solid theoretical basis. At the same time this ensures that calculated wave drag is to a certain extent independent of the specific details of the artificial viscosity in different diodes. The extension of Garabedian's and McFadden's idea accounts for the fact that artificial viscosity does not smear out supersonic/subsonic shock waves completely, but leaves room for a truly discontinuous sonic/subsonic 'shock remainder' that contributes substantially to the wave drag. Both fully conservative and nonconservative shock capture in potential flow are covered. The method can be extended to handle also pseudo Rankine-Hugoniot shock waves. An illustrative example for a transonic transport type wing is given.

N92-28713# National Aerospace Lab., Amsterdam (Netherlands). Aerodynamics Div.

FLOW GRADIENT CORRECTIONS ON HOT-WIRE MEASUREMENTS USING AN X-WIRE PROBE

J. H. M. GOODEN (Fokker B.V., Schipol-Oost (Netherlands).) and M. VANLENT (Fokker B.V., Schipol-Oost, Netherlands) 11 Jul. 1990 18 p Presented at 12th Symposium on Turbulence, Rolla, MO, 1990 Previously announced in IAA as A91-54278 (Contract NIVR-01502-N)

(NLR-TP-90255-U; ETN-92-91543) Avail: CASI HC A03/MF A01
The development of a method to correct hot wire measurements by means of a single X-wire probe for the effect of gradients normal to the plane of the wires in the mean flow velocities as well as the turbulence intensities is reported. Data processing is performed in an iterative way, using the results of measurements with different probe rolling angles, to determine the gradient corrections along the traverse from the previous loop. The method is applied to measurements in the wake above the trailing edge flap of a wing. Substantial improvements in the results are shown.

N92-28729* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NATURAL FLOW WING Patent

RICHARD M. WOOD, inventor (to NASA) and STEVEN X. S. BAUER, inventor (to NASA) 12 May 1992 13 p Filed 31 Jul. 1990

(NASA-CASE-LAR-14281-1; US-PATENT-5,112,120; US-PATENT-APPL-SN-560923; US-PATENT-CLASS-244-35R; US-PATENT-CLASS-244-36; INT-PATENT-CLASS-B64C-3/14) Avail: US Patent and Trademark Office

The invention is a natural flow wing and a method for constructing the same. The method comprises contouring a three-dimensional upper surface and a three-dimensional lower surface of the natural flow wing independently of one another into a prescribed shape. Experimental data and theoretical analysis show that flow and pressure-loading over an upper surface of a wing tend to be conical about an apex of the wing, producing favorable and unfavorable regions of performance based on drag. The method reduces these unfavorable regions by shaping the upper surface such that the maximum thickness near a tip of the natural flow wing moves aft, thereby, contouring the wing to coincide more closely with the conical nature of the flow on the upper surface. Nearly constant compressive loading characterizes the flow field over a lower surface of the conventional wing. Magnitude of these compressive pressures on the lower surface depends on angle of attack and on a streamwise curvature of the lower surface of the wing and not on a cross-sectional spanwise curvature. The method, thereby, shapes the lower surface to create an area as large as possible with negative slopes. Any type of swept wing may be used to obtain the final, shaped geometry of the upper and lower surfaces of the natural flow wing.

Official Gazette of the U.S. Patent and Trademark Office

N92-28789# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de l'Aerodynamique. FEASIBILITY STUDY OF HYPERSONIC CLINOMETRIC MEASUREMENTS AT R3CH Final Summury Report [ETUDE DE FAISIBILITE DE MESURES CLINOMETRIQUES EN HYPERSONIQUE A R3CH. RAPPORT DE SYNTHESE FINAL]
M. C. MERIENNE and M. ALAPHILIPPE Jun. 1991 46 p In FRENCH

(Contract DRET-89-34-001)

(ONERA-RSF-136/1865-AY-728-A; ETN-92-91327) Avail: CASI HC A03/MF A01

The feasibility of clinometric measurements in hypersonic flow was investigated, by a miniaturized probe with five holes, in a R3Ch wind tunnel. The phases of the study were: estimation of the response time, the design, the calibration, and the measurements on a flat plate. The probe, with one end of 2 mm

diameter, has a short response time and a high thermal resistance. The clinometric calibration performed under an incidence angle, between -4 and +4 degrees, shows a sensibility coefficient of the probe with a 4 maximal uncertainty, which represents a measurement error between 0.3 and 0.7 degrees.

N92-28820*# State Univ. of New York, Buffalo. Dept. of Mechanical and Aerospace Engineering.

MODELING OF THE REACTANT CONVERSION RATE IN A TURBULENT SHEAR FLOW

S. H. FRANKEL, C. K. MADNIA, and P. GIVI *In its* Large Eddy Simulations (LES) and Direct Numerical Simulations (DNS) for the Computational Analyses of High Speed Reacting Flows 14 p 30 Apr. 1992 Submitted for publication Avail: CASI HC A03/MF A02

Results are presented of direct numerical simulations (DNS) of spatially developing shear flows under the influence of infinitely fast chemical reactions of the type A + B yields Products. The simulation results are used to construct the compositional structure of the scalar field in a statistical manner. The results of this statistical analysis indicate that the use of a Beta density for the density function (PDF) of an appropriate Shvab-Zeldovich mixture fraction provides a very good estimate of the limiting bounds of the reactant conversion rate within the shear layer. This provides a strong justification for the implementation of this density in practical modeling of non-homogeneous turbulent reacting flows. However, the validity of the model cannot be generalized for predictions of higher order statistical quantities. A closed form analytical expression is presented for predicting the maximum rate of reactant conversion in non-homogeneous reacting turbulence.

N92-28865# Washington State Univ., Pullman. STUDY OF THE LEADING-EDGE VORTEX DYNAMICS IN THE UNSTEADY FLOW OVER AN AIRFOIL Final Report, 1 Jan. 1990 - 31 Dec. 1991

B. R. RAMAPRAIN 27 Feb. 1992 54 p (Contract AF-AFOSR-0131-90)

(AD-A247532; AFOSR-92-0222TR) Avail: CASI HC A04/MF A01
The two-year project to study the dynamics of the leading-edge vortex (LEV) over a pitching airfoil under conditions of dynamic stall, was started in January 1990. Several accomplishments have been made during these two years. The most significant of these are: (1) the construction of a special water channel suitable for the study of dynamic stall over a pitching airfoil; (2) the measurement of surface pressure distributions over the airfoil under several key operating conditions; and (3) development of the techniques of Particle Image Velocimetry (PIV) and its use in the measurement of instantaneous velocity and vorticity field in the two-dimensional flow around the airfoil. Some of these data which are the first of their kind have been used to understand the physics of unsteady vorticity dynamics over a pitching airfoil. These data are being made available to other investigators for use as database in validating their numerical models.

N92-28883# Naval Postgraduate School, Monterey, CA. FLOW VISUALIZATION STUDIES OF A SIDESLIPPING, CANARD-CONFIGURED X-31A-LIKE FIGHTER AIRCRAFT MODEL M.S. Thesis

CHANG H. KIM Dec. 1991 125 p (AD-A245940) Avail: CASI HC A06/MF A02

A water tunnel flow visualization investigation was performed to study the vortex development and bursting phenomena on a 2.3 percent scale model of a X-31A-Like fighter aircraft. The main focus of this study was two-fold: first, to study the effects of angle of attack and static sideslip on the model vortical flow field; and secondly, to study the effects of dynamic sideslip motion at two reduced yaw rates. Results indicate that the wing root vortex bursting locations move upstream as the AOA increases; and at constant angle of attack (AOA less than 30 degrees) the leeward side vortex bursting location moves backward and outboard with sideslip inputs while the windward side vortex bursting location moves forward and inboard. The vortex asymmetry switches sides

at higher angle of attack (AOA greater than 30 degrees). The dynamic lag effects, which cause the leeward side vortex to burst earlier than in the static case during the positive sideslipping motion and later than in the static case during the negative sideslipping motion, increase with the magnitude of the sideslipping motion.

GRA

N92-28888# Ohio Univ., Athens. Dept. of Mechanical Engineering.

NONLINEAR NORMAL AND AXIAL FORCE INDICIAL RESPONSES FOR A TWO DIMENSIONAL AIRFOIL Final Report

G. M. GRAHAM, M. ISLAM, and K. C. FANG 15 Nov. 1991 79 p

(Contract AF-AFOSR-0502-89)

(AD-A247196; AFOSR-92-0077TR) Avail: CASI HC A05/MF A01 Normal and axial force indicial responses for a 2-D NACA 0015 airfoil undergoing small step changes in angle of attack have been measured in a tow tank. The airfoil was pitched about the quarter chord and the Reynolds number was 95,000. First order and second order tests were conducted. In the first order tests, the angle of attack prior to the step onset was held constant. In the second order study, the airfoil was ramped up at constant rate to the onset angle. Step onset angles in the range 0 less than alpha less than 60 deg were considered. The step responses have been integrated numerically to compute the loading during a ramp-up motion. The integrated results are compared with baseline load data taken with the same airfoil.

N92-28980*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

LASER ANEMOMETER MEASUREMENTS AND COMPUTATIONS IN AN ANNULAR CASCADE OF HIGH TURNING CORE TURBINE VANES

LOUIS J. GOLDMAN and RICHARD G. SEASHOLTZ Jul. 1992 38 p

(Contract RTOP 505-62-52)

(NASA-TP-3252; E-6354; NAS 1.60:3252) Avail: CASI HC A03/MF A01

An advanced laser anemometer (LA) was used to measure the axial and tangential velocity components in an annular cascade of turbine stator vanes designed for a high bypass ratio engine. These vanes were based on a redesign of the first-stage stator. of a two-stage turbine, that produced 75 degrees of flow turning. Tests were conducted on a 0.771 scale model of the engine size stator. The advanced LA fringe system was designed to employ thinner than usual laser beams resulting in a 50-micron-diameter probe volume. Window correction optics were used to ensure that the laser beams did not uncross in passing through the curved optical access port. Experimental LA measurements of velocity and turbulence were obtained both upstream, within, and downstream of the stator vane row at the design exit critical velocity ratio of 0.896 at the hub. Static pressures were also measured on the vane surface. The measurements are compared, where possible with calculations from a 3-D inviscid flow analysis. The data are presented in both graphic and tabulated form so that they may be readily used to compare against other turbomachinery computations. Author

N92-29159# European Space Agency, Paris (France).
CALCULATION OF SUPPORT INTERFERENCES ON THE
AERODYNAMIC COEFFICIENTS FOR A WIND TUNNEL
CALIBRATION MODEL [BERECHNUNG DER
SUPPORT-INTERFERENZEN FUER DIE AERODYNAMISCHEN
BEIWERTE EINES WINDKANAL-EICHMODELLS]

DIETER STEINBACH (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Goettingen, Germany, F.R.) Feb. 1992 78 p Transl. into ENGLISH of German document (Goettingen, Fed. Republic of Germany, DLR), May 1990 p 1-63 Original language document was announced as N91-15998 (ISSN 0171-1342)

(ESA-TT-1247; DLR-FB-90-26; ETN-92-91207) Avail: CASI HC

A05/MF A01; Original German Version available from DLR, Wissenschaftliches Berichtswesen, Postfach 90 60 58, Cologne, Fed. Republic of Germany, 23 DM

Model support interferences are calculated in the form of corrections to the aerodynamic coefficients for a calibration model to be tested in a subsonic cryogenic wind tunnel. Two different model support systems are investigated: a horizontal sting (rear sting) and a vertical sting (ventral sting). The results of earlier experiments using these configurations already exist and the corrections obtained in the present work are therefore applied to these measurements for verification. In addition, the effect of the sting on the static longitudinal stability of the model is investigated in more detail. A three dimensional panel method is used for the calculations. This permits the simultaneous calculation of thickness and lift effects when several bodies of almost any given shape are present in the flow. The aerodynamic coefficients are obtained by numerical integration of the surface pressure distribution on the model.

N92-29206# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de l'Aerodynamique. DEVELOPMENT OF AN UNSTEADY THREE-DIMENSIONAL VISCOUS-INVISCID INTERACTION NUMERICAL METHOD FOR THE CALCULATION OF AIRFOILS VIBRATION Final Summary Report [DEVELOPPEMENT D'UNE METHODE NUMERIQUE D'INTERACTION VISQUEUX-NON VISQUEUX TRIDIMENSIONNELLE INSTATIONNAIRE POUR LE CALCUL DU TREMBLEMENT DES VOILURES. RAPPORT DE SYNTHESE FINALE]

P. GIRODROUX-LAVIGNE and J. C. LEBALLEUR Sep. 1991 44 p In FRENCH

(Contract STPA-85-95-009)

(ONERA-RSF-7/3617-AY-Ó22A; ETN-92-91325) Avail: CASI HC A03/MF A01

A study to predict the transonic vibration occurring in airfoils of a carrier aircraft is presented. The study was focused on the numerical technique of an inverse three dimensional unsteady boundary layer, as well as on the semi implicit unsteady coupling algorithm. The numerical results give a first approach of the coupling methods and the calculation of three dimensional separation, and restored the topology of the friction lines. The calculations were firstly performed for a subsonic flow in the following geometry conditions: a flat plate containing a wall hole with a very high three dimensionality. A separation through a transonic right wing type NACA0012 was predicted.

N92-29329*# Brown Univ., Providence, Rl. Div. of Engineering. PARAMETER IDENTIFICATION FOR NONLINEAR AERODYNAMIC SYSTEMS Semiannual Progress Report No. 5, 23 Oct. 1991 - 23 Apr. 1992

ALLAN E. PEARSON 7 May 1992 34 p (Contract NAG1-1065)

(NASA-CR-190264; NAS 1.26:190264) Avail: CASI HC A03/MF A01

Continuing work on frequency analysis for transfer function identification is discussed. A new study was initiated into a 'weighted' least squares algorithm within the context of the Fourier modulating function approach. The first phase of applying these techniques to the F-18 flight data is nearing completion, and these results are summarized.

N92-29361*# Tennessee Univ., Tullahoma. Space Inst.
DEVELOPMENT OF A MULTIGRID TRANSONIC POTENTIAL
FLOW CODE FOR CASCADES Final Technical Report
JOHN STEINHOFF 29 Jun. 1992 26 p
(Contract NAG3-398)

(NASA-CR-190480; NAS 1.26:190480) Avail: CASI HC A03/MF A01

Finite-volume methods for discretizing transonic potential flow equations have proven to be very flexible and accurate for both two and three dimensional problems. Since they only use local properties of the mapping, they allow decoupling of the grid generation from the rest of the problem. A very effective method

for solving the discretized equations and converging to a solution is the multigrid-ADI technique. It has been successfully applied to airfoil problems where O type, C type and slit mappings have been used. Convergence rates for these cases are more than an order of magnitude faster than with relaxation techniques. In this report, we describe a method to extend the above methods, with the C type mappings, to airfoil cascade problems.

N92-29402*# Sverdrup Technology, Inc., Brook Park, OH.
A COMPARISON OF THE CALCULATED AND EXPERIMENTAL
OFF-DESIGN PERFORMANCE OF A RADIAL FLOW TURBINE
Final Report

LIZET TIRRES Jul. 1991 16 p Presented at the 28th Joint Propulsion Conference and Exhibit, Nashville, TN, 6-8 Jul. 1992; sponsored in part by AIAA, SAE, ASME, and ASEE (Contract NAS3-25266; RTOP 535-05-10) (NASA-CR-189207; E-7175; NAS 1.26:189207; AIAA PAPER 92-3069) Avail: CASI HC A03/MF A01

Off design aerodynamic performance of the solid version of a cooled radial inflow turbine is analyzed. Rotor surface static pressure data and other performance parameters were obtained experimentally. Overall stage performance and turbine blade surface static to inlet total pressure ratios were calculated by using a quasi-three dimensional inviscid code. The off design prediction capability of this code for radial inflow turbines shows accurate static pressure prediction. Solutions show a difference of 3 to 5 points between the experimentally obtained efficiencies and the calculated values.

N92-29445*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SPATIAL AND TEMPORAL ADAPTIVE PROCEDURES FOR THE UNSTEADY AERODYNAMIC ANALYSIS OF AIRFOILS USING UNSTRUCTURED MESHES M.S. Thesis

JOHN R. HOOKER (Purdue Univ., West Lafayette, IN.), JOHN T. BATINA, and MARC H. WILLIAMS (Purdue Univ., West Lafayette, IN.) Jul. 1992 16 p Presented at the AIAA 10th Applied Aerodynamics Conference, Palo Alto, CA, 22-24 Jun. 1992 (Contract NAG1-372; RTOP 505-63-50-12) (NASA-TM-107635; NAS 1.15:107635) Avail: CASI HC A03/MF

(NASA-1M-107635; NAS 1.15:107635) AVAII: CASI HC AU37MF A01

An algorithm which combines spatial and temporal adaption for the time integration of the two dimensional Euler equations on unstructured meshes of triangles is presented. Spatial adaption involves mesh enrichment to add elements in high gradient regions of the flow and mesh coarsening to remove elements where they are no longer needed. Temporal adaption is a time accurate, local time stepping procedure which integrates the flow equations in each cell according to the local numerical stability constraint. The flow solver utilizes a four stage Runge-Kutta time integration scheme with an upwind flux-split spatial discretization. Results obtained using spatial and temporal adaption indicate that highly accurate solutions can be obtained with a significant savings of computing time over global time stepping.

N92-29539# Naval Surface Warfare Center, Dahlgren, VA. SECOND-ORDER SHOCK-EXPANSION THEORY EXTENDED TO INCLUDE REAL GAS EFFECTS Final Report FRANK G. MOORE, MICHAEL A. ARMISTEAD, STEVE H. ROWLES, and FRED R. DEJARNETTE Feb. 1992 177 p (AD-A247191; NAVSWC-TR-90-683) Avail: CASI HC A09/MF A02

New methods have been developed to compute inviscid surface pressures and temperatures for both perfect and equilibrium chemically reacting flows on both pointed and blunt bodies of revolution. These new methods include an improved Shock-expansion Theory, an improved Modified Newtonian Theory (MNT), and an improved method for angle-of-attack effects. Comparison of these approximate engineering techniques to exact inviscid computations using a full Euler code showed that these new methods gave very good agreement of surface temperature and pressures as well as forces and moments. Incorporation of this new technology into the NAVSWC aeroprediction code will

allow the code to be used for engineering estimates of inviscid surface temperature at high Mach numbers. These approximate temperatures can then be used as inputs to perform heat transfer analysis.

N92-29625*# National Aeronautics and Space Administration.
Ames Research Center, Moffett Field, CA.
NASA WORKSHOP ON FUTURE DIRECTIONS IN SURFACE
MODELING AND GRID GENERATION

W. R. VANDALSEM (National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.), R. E. SMITH (National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.), Y. K. CHOO (National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.), L. D. BIRCKELBAW, and A. A. VOGEL Mar. 1992 24 p Workshop held at Moffett Field, CA, 5-7 Dec. 1989 (Contract RTOP 505-59-00)

(NASA-CP-10092; A-92072; NAS 1.55:10092) Avail: CASI HC A03/MF A01

Given here is a summary of the paper sessions and panel discussions of the NASA Workshop on Future Directions in Surface Modeling and Grid Generation held a NASA Ames Research Center, Moffett Field, California, December 5-7, 1989. The purpose was to assess U.S. capabilities in surface modeling and grid generation and take steps to improve the focus and pace of these disciplines within NASA. The organization of the workshop centered around overviews from NASA centers and expert presentations from U.S. corporations and universities. Small discussion groups were held and summarized by group leaders. Brief overviews and a panel discussion by representatives from the DoD were held, and a NASA-only session concluded the meeting. In the NASA Program Planning Session summary there are five recommended steps for NASA to take to improve the development and application of surface modeling and grid generation.

N92-29648# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Hubschrauber und Flugzeuge.
TECHNOLOGY PROGRAMME: AEROTHERMODYNAMICS AND

PROPULSION INTEGRATION. NUMERICAL AND EXPERIMENTAL AEROTHERMODYNAMICS

E. H. HIRSCHEL 26 Aug. 1991 13 p Presented at the Review of the German Hypersonic Research and Technology Programme, Bonn, Fed. Republic of Germany, 16-17 Apr. 1991 (MBB-FE-202-S-PUB-0464-A; ETN-92-91497) Copyright Avail: CASI HC A03/MF A01

Work performed in the fields of 'aerothermodynamic predesign methods (approximate methods)', 'numerical methods aerothermodynamics' 'experimental and aerothermodynamics' is reviewed. The objective of the work is sketched, major results are listed, examples are given and future efforts are outlined. The examples include applications of predesign methods and numerical methods for the determination of global forces and moments, aerodynamic loads and heat loads (for the latter also a study of the influence of different flow physical model assumptions). From the field of experimental aerothermodynamics, an application of a fluorescence method is given, and the picture of a wind tunnel model is shown in order to demonstrate the complexity of such test articles. At the middle of phase 1 of the technology program, basic aerothermodynamic design tools and methods are available, which will reach the first validation level at the end of phase 1. Large deficiencies in flow physical models (transition laminar-turbulent, turbulence, etc.) were identified and basics oriented and applications oriented work was initiated at universities and research establishments. Thus, work will help the second validation level, which is needed when the development of the Saenger space transportation systems begins.

N92-29649# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Flugzeuge.

AEROTHÉRMÓDYNAMICS AND PROPULSION INTEGRATION IN THE SAENGER TECHNOLOGY PROGRAMME

E. H. HIRSCHEL 16 Sep. 1991 12 p Previously announced

in IAA as A92-17829 (MBB-FE-202-S-PUB-0469-A; AIAA PAPER 91-5041; ETN-92-91499) Copyright Avail: CASI HC A03/MF A01

The objectives of the technology program 'aerothermodynamics and propulsion integration' are defined. An overview of the special aerothermodynamic phenomena which must be regarded in the design of the Saenger lower stage, which presently stands in the center of the technology program, is given. The design tools, which must be provided, the components like the inlet, and the afterbody. which must be designed and tested, and the special problems like forebody optimization, heat load determination, and upper stage separation, which must be treated, are discussed. The general work plan, with the major activities up to the start of the development of the Saenger space transport system is presented, including the development and manufacturing of an experimental vehicle (HYTEX) as a means for the validation of the design tools and methods which are achieved in the technology program, and for the creation of a free flight data base. Examples given include applications of predesign methods and numerical methods for the determination of global forces and moments, aerodynamic loads and heat loads, for the latter also a study of the influence of different flow physical model assumptions. Results from the inlet study, the stage separation study, etc., show the advancement in these areas. **ESA**

N92-29657*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.

DETERMINATION OF AERODYNAMIC SENSITIVITY COEFFICIENTS FOR WINGS IN TRANSONIC FLOW

LELAND A. CARLSON and HESHAM M. EL-BANNA May 1992

(Contract NAG1-793)

(NASA-CR-190570; NAS 1.26:190570; TAMRF-5802-92-02)

Avail: CASI HC A02/MF A01

The quasianalytical approach is applied to the 3-D full potential equation to compute wing aerodynamic sensitivity coefficients in the transonic regime. Symbolic manipulation is used to reduce the effort associated with obtaining the sensitivity equations, and the large sensitivity system is solved using 'state of the art' routines. The quasianalytical approach is believed to be reasonably accurate and computationally efficient for 3-D problems.

N92-29691*# California Polytechnic State Univ., San Luis Obispo. Dept. of Aeronautical Engineering.

COMPUTATION OF THREE-DIMENSIONAL EFFECTS ON TWO **DIMENSIONAL WINGS Final Technical Report**

RUSSELL M. CUMMINGS Jul. 1992 11 p

(Contract NCC2-536)

(NASA-CR-190576; NAS 1.26:190576) Copyright Avail: CASI

HC A03/MF A01

A 2-D numerical investigation was performed to determine the effect of a Gurney flap on a NACA 4412 airfoil. A Gurney flap is a flat plate on the order of 1 to 3 percent of the airfoil chord length, oriented perpendicular to the airfoil chord line and located at the trailing edge of the airfoil. An incompressible Navier Stokes code, INS2D, was used to calculate the flow field about the airfoil. The fully turbulent results were obtained using the Baldwin-Barth one-equation turbulence model. Gurney flap sizes of 0.5, 1, 1.25, 1.5. 2. and 3 percent of the airfoil chord were studied. Computational results were compared with experimental results where possible. The numerical solutions show that the Gurney flap increases airfoil lift coefficient with only a slight increase in drag coefficient. Use of a 1.5 percent chord Gurney flap increases the maximum lift coefficient by approximately 0.3 and decreases the angle of attack for a given lift coefficient by more than 3 degrees. The numerical solutions exhibit detailed flow structures at the trailing edge and provide a possible explanation for the increased aerodynamic performance. Author

Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Flugzeuge. HYPERSONIC FLOW PAST RADIATION-COOLED SURFACES E. H. HIRSCHEL, A. KOC, and S. RIEDELBAUCH (Deutsche

Forschungsanstalt fuer Luft- und Raumfahrt, Goettingen, Germany. F.R.) 16 Sep. 1991 10 p Previously announced in IAA as A92-17821

(MBB-FE-202-S-PUB-0468-A; AIAA PAPER 91-5031; ETN-92-91498) Copyright Avail: CASI HC A02/MF A01

Hypersonic vehicles employ surface radiation cooling in order to reduce heat loads. The radiation adiabatic surface temperature is the result of the balance of the heat conduction towards the surface and the heat radiated away from the surface, if no heat transport into the surface occurs. It is shown by means of a local analysis that the radiation adiabatic temperature depends, other than the recovery temperature, on a characteristic boundary layer thickness. The state of the boundary layer (laminar or turbulent) has a much larger influence on the radiation adiabatic temperature than on the recovery temperature. The local analysis explains, for example, why hot spots appear along attachment lines. With the classical wind tunnel simulation techniques the radiation adiabatic temperature cannot be determined. A 'hot experimental technique' is needed if an accurate determination of heatloads in the presence of radiation cooling is desired. It involves a duplication or near duplication of Mach and Reynolds number, total temperature, and a model surface in radiation adiabatic equilibrium. The length scale dependency of the radiation adiabatic temperature then makes a scaling to full size necessary. This is shown to be possible for laminar flow, but not yet for turbulent flow.

N92-29741# Universitaet der Bundeswehr Muenchen, Neubiberg (Germany, F.R.). Fakultaet fuer Luft- und Raumfahrttechnik. A SEMI EMPIRICAL METHOD FOR THE ANALYTICAL REPRESENTATION OF STATIONARY MEASURED PROFILE COEFFICIENTS FOR APPLICATIONS OF ROTARY WING AERODYNAMICS Ph.D. Thesis [EINE HALBEMPIRISCHE METHODE ZUR ANALYTISCHEN DARSTELLUNG STATIONAAR GEMESSENER PROFILBEIWERTE FUER ANWENDUNGEN DER DREHFLUEGLERAERODYNAMIK] MANFRED LERCH 1990 190 p In GERMAN (ETN-92-91491) Avail: CASI HC A09/MF A02

The semi empirical process presented is used for the closed representation of aerodynamic coefficients, from the point of view of flow conditions occurring in rotor blades. The aerodynamic coefficients are formulated analytically in the model as a function of the inflow components. Analytical functions are presented on the basis of the superposition principle. They reproduce the various flow conditions by simple theoretical and empirical formulations. The superposition of these functions leads to a qualitatively accurate representation of the aerodynamic coefficients. On the basis of the quaternions transformation, a mechanical auxiliary model was developed for the computation of the motion behavior of helicopter rotors. **ESA**

N92-29884# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

EVALUATION OF MEASURED-BOUNDARY-CONDITION METHODS FOR 3D SUBSONIC WALL INTERFERENCE

T. E. LABRUJERE, T. A. MAARSINGH, and J. SMITH

(NLR-TR-88072-U; ETN-92-91547) Avail: CASI HC A06/MF A02 Measurements of a simple aircraft model on both an appropriately sized and a relatively large, low/speed, solid/wall test section were used to analyze the accuracy and consistency Measured/Boundary/Condition (MBC) methods. completeness, the classical method of images, with two different correction procedures, was also analyzed. For the MBC methods, large reductions in the amount of in situ measured boundary data turn out to be possible, while almost retaining the accuracy obtained from abundant boundary data. In addition, high computing efficiency was achieved allowing on line wall interference assessment and correction during a wind tunnel test. The classical assessment methods turns out to be competitive with the MBC methods for the mode and test conditions considered (CL less than or equal to 2, no massive flow separation). Its applicability is limited, like any method requiring a theoretical representation of the mode flow. Some attention was paid to the definition of the reaction of the model to the wall/induced velocity field, i.e., the correction procedure. The analyses suggest that improvements and/or adaptations are desirable.

N92-29889# Universitaet der Bundeswehr Muenchen, Neubiberg (Germany, F.R.). Fakultaet fuer Luft- und Raumfahrttechnik.
PRODUCTION OF PERIODICAL MACH NUMBER VARIATIONS IN HIGH SUBSONIC FLOW IN A BLOW DOWN WIND TUNNEL, AND ITS INFLUENCE ON PROFILE MEASUREMENTS Ph.D. Thesis [ERZEUGUNG PERIODISCHER

MACHZAHLAENDERUNGEN IN HOHEN UNTERSCHALL IN EINEM BLOW-DOWN-WINDKANAL UND IHR EINFLUSS AUF DIE PROFILMESSUNGEN]

ROBERT SPELTEN 1990 138 p In GERMAN (ETN-92-91492) Avail: CASI HC A07/MF A02

The properties of unsteady flow in a blow down wind tunnel are described. A follow up system allows the Mach number variations to be correlated from two channel gage lengths. It is determined that transonic profile flows display strong dynamic attenuation phenomena for the transmission of the mass flow stimulation. A process based on the measured Mach number variations was developed, according to which the representative Mach numbers can be theoretically determined for the model. The model developed is to be used for other two and three dimensional models.

N92-29916# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

A METHOD FOR COMPUTING THE 3-DIMENSIONAL FLOW ABOUT WINGS WITH LEADING-EDGE VORTEX SEPARATION. PART 2: DESCRIPTION OF COMPUTER PROGRAM VORSEP H. W. M. HOEIJMAKERS 10 Jan. 1986 282 p

(NLR-TR-86006-U; ETN-92-91546) Avail: CASI HC A13/MF A03

The VORSEP program, which computes the three dimensional flow about wings with leading edge vortex separation, is described. An introduction to the computation method is given. The input required for running the program is detailed. A technical description of VORSEP and its subroutine is given. Common blocks employed in the program are detailed and the auxiliary files used are described. A sample case of the output generated by the program is presented.

N92-30182*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

EXPERIMENTAL INVESTIGATION OF THE FLOWFIELD OF AN OSCILLATING AIRFOIL

J. PANDA and K. B. M. Q. ZAMAN Jun. 1992 20 p Presented at the 10th Applied Aerodynamics Conference, Palo Alto, CA, 22-24 Jun. 1992; sponsored by AIAA

(Contract RTOP 505-62-52)

(NASA-TM-105675; E-7046; NAS 1.15:105675; AIAA PAPER 92-2622-CP) Avail: CASI HC A03/MF A01

The flowfield of an airfoil oscillated periodically over a wide range of reduced frequencies, 0 less than or = k less than or = 1.6 is studied experimentally at chord Reynolds numbers of R sub c = 22,000 and 44,000. The NACA0012 airfoil is pitched sinusoidally about one quarter chord between angles of attack (alpha) of 5 and 25 degrees. Detailed flow visualization and phase averaged vorticity measurements are carried out for k = 0.2 to document the evolution and the shedding of the dynamic stall vortex (DSV). In addition to the DSV, an intense vortex of opposite sign originates from the trailing edge just when the DSV is shed. After being shed into the wake, the two together take the shape of a large 'mushroom' while being convected away from the airfoil. The unsteady circulation around the airfoil and, therefore, the time varying component of the lift is estimated in a novel way from the shed vorticity flux and is found to be in good agreement with the lift variation reported by others. The delay in the shedding of the DSV with increasing k, as observed by previous researchers, is documented for the full range of k. The DSV, for example, is shed nearly at the maximum alpha of 25 degrees at k = 0.2, but is shed at the minimum alpha of 5 degrees at k = 0.8. At low k, the flowfield appears quasi-steady and the bluff body shedding corresponding to the maximum alpha (25 degrees) dominates the unsteady fluctuations in the wake.

Author

03

AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

A92-44931 National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

WHO OR WHAT SAVED THE DAY? A COMPARISON OF TRADITIONAL AND GLASS COCKPITS

ASAF DEGANI (San Jose State University Foundation; NASA, Ames Research Center, Moffett Field, CA), SHERYL L. CHAPPELL (NASA, Ames Research Center, Moffett Field, CA), and MICHAEL S. HAYES (Air Line Pilots Association, Herndon, VA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 227-234. Research supported by NASA, Air Line Pilots Association, and Delta Air Lines, Inc. refs (Contract NCC2-237)

This study examined incidents reported to NASAs Aviation Safety Reporting System from a different perspective: rather than focusing on the factors contributing to or causing incidents, this study concentrated on who and what (subsystems and information) enabled the recovery from an anomaly. Incident reports describing altitude deviations were classified as to cockpit type (glass or traditional), flight phase, agent restoring safety, and cockpit subsystems providing specific information that helped restore safety. The data revealed and quantified the agents, information, and factors that 'saved the day'. The flight crews used many sources of information to detect the altitude deviations: altimeter, outside scene, altitude alert, kinesthesia, attitude and communications monitoring. In the glass cockpits the crews also used the map display and autothrottles to detect deviations from assigned altitudes. There was an interaction between the person detecting the anomaly (controller/flight crew) and the type of cockpit. Glass cockpit flight crews detect proportionally more deviations than their counterparts in traditional cockpits, while controllers tend to detect more deviations involving traditional cockpits. There was no effect of cockpit position (captain/first officer). A model that details the flow of altitude information between air traffic control, flight crews, and cockpit subsystems, was developed and validated. This model identifies strengths and weaknesses in the flow of altitude information within the current ground/air system. Author

A92-44985* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

A RE-ANALYSIS OF THE CAUSES OF BOEING 727 'BLACK HOLE LANDING' CRASHES

MARTIN F. J. SCHWIRZKE (San Jose State University, CA) and C. T. BENNETT (NASA, Ames Research Center, Moffett Field, CA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 572-576. refs

A review is presented of Kraft and Elworth's (1969) investigation and analysis of night visual approaches; their data is reanalyzed, and the reliability of the visual angle hypothesis is discussed. To increase pilot awareness of the hazardous illusions inherent in black hole landings, it was suggested that pilots should monitor their altimeters more often during night approaches. It was also recommended that greater attention should be given to airport design, so that the effects of black hole conditions could be minimized.

R.E.P.

A92-44993

AN AIRCRAFT LANDING ACCIDENT CAUSED BY VISUALLY INDUCED SPATIAL DISORIENTATION

WILLIAM R. ERCOLINE, LISA F. WEINSTEIN (Krug International Corp., Technology Life Sciences Div., Brooks AFB, TX), and KENT K. GILLINGHAM (USAF, Armstrong Laboratory, Brooks AFB, TX) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 619-623. refs

Contrary to popular belief, the causes of pilot spatial disorientation are not restricted to false vestibular sensations; the contributions of additional sensory effects are presently explored in view of an accident scenario involving the nighttime landing of three different large aircraft. The mishap is shown to have been precipitated by the confluence of three separate sensory illusions: a narrow runway whose lights implied greater-than actual altitude, the absence of green threshold lights, and the visual degradation effects of shallow fog over the runway.

O.C.

A92-44995

SCENARIO ANALYSIS OF THIGH GAP RELATED EJECTION INJURIES

JOHN SCHMIDT, GARY WHITMAN, DAVE ROSE, and LISA STEVENS (U.S. Navy, Naval Air Development Center, Warminster, PA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 630-635. refs

Columbus, OH, Ohio State University, 1991, p. 630-635. refs
Ejection injuries were examined to determine the impact of thigh gap. Tower test films, seat velocity analyses, cockpit fit checks, modeled cockpit comparisons, and combined expert opinions indicate it primarily puts specific body parts at risk during ejection. Statically, hip rotation causes poor back and neck positioning. Dynamically, the seat impacts the upper leg and drives down the lower portion, stressing both the thigh and knee. Scenario analysis of an ejection mishap experience data base, focusing on these sequences, revealed that only 122 (6.2 percent) of the total 1,966 cases considered were potentially related to thigh gap. Further, only ten cases temporarily disqualified aircrew from flight and none permanently did so, indicating thigh gap is not a major hazard.

A92-44996

STOP, LOOK AND LEARN FROM ACCIDENT INVESTIGATION

HENRY L. COOK (Jungle Aviation and Radio Service, Waxhaw, NC) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 636-639.

An account is given to a method for helping pilots and aircraft mechanics learn from the mistakes of others through role-playing. In this training process, the reading of an accident report is followed by the participants' efforts to recreate the sequence of events which led to the mishap. The illustrative case from which lessons concerning the power of imaginative recreations of an accident scenario are drawn involved a helicopter landing.

O.C.

A92-44997

THE EFFECTIVENESS OF TRAINING PROGRAMS FOR PREVENTING AIRCREW 'ERROR'

ALAN DIEHL (USAF, Inspection and Safety Center, Norton AFB, CA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 640-655. refs

This paper summarizes statistics on the prevalence of various categories of aircrew errors (procedural, perceptualmotor, and decisional) in general aviation, airline, and military operations. Decisional mistakes accounted for over one-half of such errors in all three operational environments. For that reason, the last decade has seen the growing use of cockpit resource management and judgment training programs to improve the effectiveness of individual and crew decisionmaking. These innovative programs ideally incorporate five kinds of training tools dealing with attention, crew, stress, mental attitude and risk management. The evidence suggests that such programs may reduce accident rates from 28

to 81 percent. A model is proposed to explain the feedback mechanisms involving situational awareness and the procedural, perceptualmotor, and decisional tasks along with the faculties of knowledge, motivations, and abilities.

A92-44998

THE EFFECT ON AIRCRAFT EVACUATIONS OF PASSENGER BEHAVIOUR AND SMOKE IN THE CABIN

HELEN MUIR and CLAIRE MARRISON (Cranfield Institute of Technology, England) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 656-661. refs

In response to a request from the UK CAA, an experimental program was conducted to characterize the effects of passenger behavior on the flow rates of emergency evacuation under conditions of vision impairment by smoke. The objective of this investigation was to ascertain the optimum width of the bulkhead prior to type I exit, as well as the seating configuration adjacent to the overwing exit. The results of a comparison of video data from competitive and noncompetitive evacuations (NCEs) indicate that NCEs effectively simulated aircraft behavior in precautionary evacuations, and in evacuations in which cabin physical conditions have not deteriorated.

492-44999

AIRLINE DEREGULATION - IMPACT ON HUMAN FACTORS

W. H. GUNN (Kansas, University, Medical Center, Kansas City) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 662-667. refs

Advocates of airline deregulation defend the associated relaxation of government surveillance of industry economics by citing statistics which deny that air safety has been compromised. An examination is presently conducted of possible deleterious effects of deregulation on airline safety, associated with such factors as the straining of ATC by increased traffic volumes, reduced financial capacity of carriers, engineering and safety staff cutbacks, and crew fatigue due to increased pressure to meet schedule demands. Attention is given to five actual cases of deregulation-related accidents in airline operation.

A92-45000

ORGANIZATIONAL FACTORS IN HUMAN FACTORS ACCIDENT INVESTIGATION

NEIL JOHNSTON IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 668-673. refs

It is argued that many previous aircraft-accident investigations have been superficial, with inevitable consequences for the effectiveness of accident-prevention programs. Attention is drawn to the need to look beyond proximate events associated with a given accident or incident, in order to ascertain less obvious but perhaps more significant precursor events. Organizational factors are noted to be a major source of precursors that are easily overlooked, as investigators focus on the failures of individuals to the exclusion of 'systems'.

A92-45041

ELIMINATING PILOT-CAUSED ALTITUDE DEVIATIONS - A HUMAN FACTORS APPROACH

ROBERT L. SUMWALT, III (Air Line Pilots Association, Columbia, SC) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 929-934. refs

The consequences of commercial aircraft altitude deviations range from rapid maneuvers to correct the oversight to near-collision incidents and actual accidents. An account is presently given of an airline's design and implementation of an altitude-awareness program involving: (1) mandatory education, (2) alerter-setting procedures, (3) altitude callouts, and (4) several recommended techniques. In the course of 8 months after program

initiation, the airline has witnessed a 60-65 percent reduction in altitude deviations with loss of flight-path separation. Additional improvements are expected due to learning-curve considerations.

O C

A92-45044

A TRAINING PROGRAM FOR AIRLINE LINE INSTRUCTORS

ROSS TELFER (Newcastle, University, Australia) and JOHN BENT (Cathay Pacific Airways, Hong Kong) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 945-951. refs

Line-training of pilots has in the past been dominated by short-term needs and virtual crisis management. Innovative proposals for change in line-instructor preparation have nevertheless been obviated by relative success with conventional, piecemeal methods. Attention is presently given to a workshop teaching-based program for line-pilot training, which employs as its literature a 24-page course preparation booklet, a 39-page presenter's quide, and a 113-page reference manual.

A92-45048

JUDGEMENT TRAINING FOR ALASKAN PILOTS

JOHN H. DALY, III IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 970-973.

After reviewing Alaskan aviation accident records and statistics, it was realized that their information was too general and often incomplete to serve as a basis for determining the character of the content of a judgment-training program for pilots. After reviewing Arctic Training programs, it was decided that these were of limited value in determining the Alaska Transition Pilots course requirements, due to their heavy reliance on 'on-the-job' flight training. Attention is given to a methodology which combines the Flanagan (1954) 'critical accident technique' with the Instructional Systems Development job-analysis process.

A92-45052

REJECTED TAKEOFFS - CAUSES, PROBLEMS, AND CONSEQUENCES

ROY W. CHAMBERLIN (Battelle, Aviation Safety Reporting System Program Office, Mountain View, CA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 993-998.

Rejected takeoffs (RTOs), which introduce risks associated not only with the takeoff-abort process itself but with numerous consequent events, are indicative of a general breakdown in human performance. Successfully managed RTOs involve an adroit combination of pilot perception and suitable action in order to avoid hazardous consequent events. An account is presently given of RTO-factors studies being conducted within the framework of NASA's Aviation Safety Reporting System. The most significant causes of crew-induced RTOs are improper communications procedures influenced by such external conditions as approach-frequency congestion and general schedule pressures.

O.C

A92-45054* National Aeronautics and Space Administration, Washington, DC.

EMPIRICAL FOUNDATIONS AND SENSITIVITY TESTING - IS IT ENOUGH FOR THE 90'S?

JAMES P. JENKINS (NASA, Washington, DC) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 1008-1013. refs

The FAA, in conjunction with the DOD, NASA, and the UK's Civil Aviation Administration, has devised a National Plan for Aviation Human Factors (NPAHF). Attention is presently given to the scope of research methods that are most useful for implementing NPAHF. Program managers in industry, government, and academia should identify tradeoffs intrinsic to the assembly

of such methods, and justify the rationale for their choices in their research proposals.

A92-45055

ICAO FLIGHT SAFETY AND HUMAN FACTORS PROGRAMME

DANIEL E. MAURINO (International Civil Aviation Organization, Montreal, Canada) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 1014-1019. refs

The ICAO established its Flight Safety and Human Factors Program and Study Group. The first step toward achieving the Program's educational objectives is the organization of regional five-day seminars; two of these will be conducted each year in three-year cycles. At the end of each such cycle, a world-wide symposium will be held so that recent progress in human factors can be examined by leading authorities of the aviation community; the plan of investigative efforts for the following three-year period can then be reformulated in light of these discussions. The first of these symposia was held in Leningrad (now St. Petersburg) in April, 1990.

A92-45080

GETTING TEST ITEMS TO MEASURE KNOWLEDGE AT THE LEVEL OF COMPLEXITY WHICH LICENSING AUTHORITIES DESIRE - ANOTHER DIMENSION TO TEST VALIDITY

GRAHAM J. F. HUNT (Massey University, Palmerston North, New Zealand) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 1169-1177. refs

Initial findings are presented from a study that may be fundamentally relevant to training/licensing examinations; a very significant mismatch is noted between the intent of competency specifications and their reality. A methodology is presented for the reduction of this discrepancy through explication of desirable attributes for each content- and process-level intercept. It is recommended that more emphasis be placed on the development of test construction technologies which facilitate a 'content-process construct' of validity, which may be as important to overall test validity as the conventional 'criterion-referenced' validity.

A92-4508

MANDATORY PSYCHOLOGICAL TESTING OF PILOTS AS A REQUIREMENT FOR LICENSING IN NORWAY?

GRETE MYHRE (Royal Norwegian Air Force, Institute of Aviation Medicine, Blindern, Norway) and BJARNE HATTESTAD (SAS Norway, Oslo) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 1178-1183.

A test battery has been devised for evaluating pilot-training candidates which proceeds entirely on the basis of pencil and paper. The battery encompasses a short version of the Raven progressive matrices test for general mental abilities, the Gottshaldt embedded figure test for visual ability, a mechanical comprehension test, a spatial relations test, an instrument-dial interpretation test, a long-term memory test, a mathematical comprehension test, an English-comprehension test, and the Plutchick Life Style Index of Defensive Strategies test for identification of the mentally disturbed.

A92-45424

AIRCRAFT COMMAND IN EMERGENCY SITUATIONS (ACES)

THOMAS L. REYNOLDS (FAA, Washington, DC) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 545-561.

(SAE PAPER 912039) Copyright

This paper describes a multiphase technical study that has defined two advanced inflight smoke/fire detection system approaches for commercial jet aircraft. Four specific areas are studied: sensing, alerting, crew response, and crew decision making. The objective of Phase I was to identify system concepts

that would provide for accurate, timely, and complete guidance to the flight crew for their use in responding to inflight smoke and fire events within the pressurized fuselage. Phase II of the project, currently in work, will result in the functional test and demonstration of the prototype system concepts defined in Phase I.

SPECTROGRAM DIAGNOSIS OF AIRCRAFT DISASTERS

FRANK W. SLINGERLAND (National Research Council of Canada, IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 563-567. Research supported by National Research Council of Canada, refs (SAE PAPER 912041) Copyright

Impulsive forces applied to an aircraft fuselage generate radial vibration waves in the structure analogous to those in a classical thin shell. It has been found that these waves are detected by the cockpit area microphone, and that spectrogram analysis of the microphone recording can provide information on the nature, origin and strength of the source, whether an explosion or a sudden decompression.

A92-45426

ON THE POSSIBILITY OF FREEZING AND STICKING PHENOMENA IN A TRANSPORT DURING THE GROUND TAXIING AND TAKEOFF RUN AND ON THE PREVENTIONS OF THE HAZARD

KINGO TAKSAWA (National Aerospace Laboratory, Tokyo, Japan) and MITSUO SAKA (Japan Air System, Tokyo) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 569-580. refs

(SAE PAPER 912042) Copyright

In the present analytical study of slush-sticking and freezing phenomena associated with the tail surfaces of a commuter airliner during ground operations, a simple model decribing outflows of heat from slush to the surrounding airflow, involving both conduction and evaporation, has given attention to meteorological and operational conditions' effects on the heat-transfer rate. Also noted is the effect of the spraying of aircraft deicing fluid, as reflected by a survey of pilots' experiences.

A92-46660

OSCILLATIONS OF BALLOON-FLIGHT ALTITUDE [O KOLEBANIIAKH VYSOTY POLETA AEROSTATA]

E. L. ALEKSANDROV and Z. M. KOZLOVA IN: Atmospheric optics. Moscow, Gidrometeoizdat, 1990, p. 55-62. In Russian. refs

Copyright

The oscillating motions of a balloon situated at the equilibrium level are examined. Radar observations of balloon flight are analyzed. Altitude oscillations of balloon flight are revealed whose parameters can be described by the theory of the oscillation of an isolated gaseous volume in a stably stratified atmosphere.

L.M.

A92-46779

STRUCTURAL RISK ASSESSMENT IN THE ISRAEL AIR FORCE FOR FLEET MANAGEMENT

ZOHAR YOSIBASH (Israeli Air Force, Tel Aviv, Israel) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 540-544. refs

As operational aircraft accumulate service hours in the Israel Air Force (IAF), cracks begin to appear in structural components. IAF Logistic Center is often requested to determine whether flying can be continued without repair and the associated risk of failure. Those questions and many others cannot be addressed using only the Damage Tolerance Assessment. A computer program, 'RISK', based on statistical methods, was developed in the IAF to provide fleet managers with quantitative assessments of the risk

associated with each maintenance decision. This paper presents the theoretical background, details of the computer program RISK and samples of two risk analyses performed by the IAF using it.

Author

A92-46784

AIRCRAFT-TRIGGERED LIGHTNING - PROCESSES FOLLOWING STRIKE INITIATION THAT AFFECT AIRCRAFT

VLADISLAV MAZUR (NOAA, National Severe Storms Laboratory, Norman, OK) and JEAN-PATRICK MOREAU (ONERA, Chatillon, Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 575-580. refs (Contract DTFA03-87-A-00021)

Copyright

The analysis of airborne electromagnetic records of seven lightning strikes to the FAA CV-580 instrumented airplane during the 1987 field campaign and eleven strikes to the French C-160 airplane during the 1988 Transall campaign was aimed at revealing and interpreting processes taking place during the intracloud propagation of lightning strikes initiated on or intercepted by the airplane. It is shown that intracloud development of the strike may consist of recoil streamers, dart leader/return stroke sequences, and the secondary initiations of new discharges. These processes, with their high current-pulse amplitudes, may present greater threat to aircraft than current pulses during strike initiation. The latter are presently considered by the technical community to be the primary lightning threat to aircraft. Author

A92-47775

SAFETY IN THE SKY - DESIGNING BOMB-RESISTANT **BAGGAGE CONTAINERS**

STEVEN ASHLEY Mechanical Engineering (ISSN 0025-6501), vol. 114, no. 6, June 1992, p. 81-86. Copyright

A review is presented of how experts in explosives and aircraft-survivability methods are researching ways to make commercial airliners more resistant to terrorist bombs. The immediate focus is on redesigned baggage containers that suppress shock waves and contain exploding fragments while safely bleeding off or venting high-pressure gases. Attention is given to the research and testing being conducted at the FAA Technical Center, various commercial organizations, military research bureaus, and foreign research laboratories.

A92-47925

AIRPORT X-RAY SCREENING TECHNOLOGY BECOMES A **VIABLE EXPLOSIVES DETECTOR**

FRANK G. MCGUIRE SAFE Journal, vol. 22, no. 3, May-June 1992, p. 11-16. Copyright

The use of advanced X-ray technologies in detecting explosives at airports is shown to be practical by considering current capacities for X-ray exploitation. The development of X-ray technology is reviewed, and attention is given to the theoretical and functional aspects of modern X-ray detection. The paper emphasizes the relative merits of backscatter vs normal X-ray techniques, and the human operator is identified as the key weakness in X-ray detection effectiveness. An automatic 'explosives detection system' (EDS) is described which uses a backscatter system and artificial intelligence to replace video and human monitors. Training is shown to be a determining factor in the assessment of security risks that may be equal to the selection of suitable technology.

A92-48793#

COMPUTATIONAL ICING ANALYSIS FOR AIRCRAFT INLETS

E. P. SCHUSTER, M. S. FISHER, and J. M. GAMBILL (McDonnell Aircraft Co., Saint Louis, MO) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs

(AIAA PAPER 92-3178) Copyright

The consideration of inlet icing in the aircraft design process requires analytical processes to provide accurate and timely predictions of icing extent and rate. The objective of the effort discussed in this paper was to establish a rapid inlet icing analysis procedure, suitable for preliminary inlet design, that can provide +/- 10 percent accuracy when compared to experimental data. An icing analysis procedure, utilizing several analytical computer codes, has been developed that meets this objective. This procedure builds on current capability existing for airfoils and expands it to inlets. With this procedure, water collection efficiencies of exposed aircraft inlet surfaces are determined by computation of water droplet trajectories and impingements for given conditions of airspeed, engine airflow, atmospheric pressure and temperature, and inlet angle of attack.

N92-28530# Naval Air Test Center, Patuxent River, MD. Strike Aircraft Test Directorate.

USE OF HIGH-FIDELITY SIMULATION IN THE DEVELOPMENT OF AN F/A-18 ACTIVE GROUND COLLISION AVOIDANCE SYSTEM

TIMOTHY R. FITZGERALD and MICHAEL T. BRUNNER In AGARD, Piloted Simulation Effectiveness 13 p Feb. 1992
Copyright Avail: CASI HC A03/MF A03

An active Ground Collision Avoidance System (GCAS) was developed for the F/A-18 using the Naval Air Test Center's F/A-18 simulation. The simulation was used for the development of all three components of GCAS: (1) the algorithms used to determine the recovery initiation altitude; (2) the additional flight control laws (FCL's) necessary to perform the recovery maneuver; and (3) the visual and audio cues used to provide recovery status information to the pilot. The use of a simulation has allowed the rapid development of a viable F/A-18 GCAS that incorporates technology from the F/A-18 Integrated Fire and Flight Control (IFFC) simulation and the Advanced Fighter Technology Integration (AFTI) F-16 program. Complete system development and preliminary evaluations were performed using the simulation. This increased overall project safety while decreasing development and potential flight test costs significantly.

N92-28655# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.

APPLICATION OF KNOWLEDGE-BASED SYSTEMS FOR DIAGNOSIS OF AIRCRAFT SYSTEMS [TOEPASSING VAN KENNISSYSTEMEN VOOR DIAGNOSE VAN VLIEGTUIGSYSTEMEN]

J. C. DONKER and M. A. PIERS 28 Apr. 1990 22 p In DUTCH Presented at the Al Applications Conference, Kerkrade, Netherlands, 10-15 Jun. 1991 (Contract NIVR-01708-N)

(NLR-TP-90192-U; ETN-92-91439) Avail: CASI HC A03/MF A01

The applicability of knowledge based systems for the monitoring and diagnosis of aircraft systems was investigated in order to provide tools with which maintenance can be performed more effectively and efficiently. A knowledge based system was designed to support ground engineers in the maintenance of the Fokker 100 air conditioning system. The evaluation shows that the system performs well if complaints are described with enough detail. The main conclusion is that design and experience knowledge needed to support the maintenance personnel can be collected and implemented in a usable system.

N92-28900# Federal Aviation Administration, Atlantic City, NJ. DROP TEST: CESSNA GOLDEN EAGLE 421B Technical Report, Feb. - Nov. 1990

ROBERT MCGUIRE, WILLIAM NISSLEY, and ANTHONY WILSON May 1992 139 p

(DOT/FAA/CT-TN91/32; AD-A252734) Avail: CASI HC A07/MF

The results of two airplane vertical impact tests conducted at the Federal Aviation Administration (FAA) Technical Center, Atlantic City International Airport, New Jersey are presented. These tests entailed dropping a low wing, twin engine Cessna 421B aircraft from a vertical height of 11.2 feet, resulting in an impact velocity of approximately 26.0 feet per second (ft/s). In both tests, the aircraft was configured to simulate actual in-flight conditions including seats, occupants, and fuel. The structural response of

the airframe, seats, and simulated occupants (anthropomorphic dummies) were measured throughout the tests, and the results are presented. The data collected in these tests and future tests of other commuter type aircraft will provide the basis for improved seat standards for commuter airplanes. These tests describe the impact response characteristics of commuter category airplane airframes, floor structures, seats, seat attachments, and occupant restraint systems.

N92-29182# Federal Aviation Administration, Washington, DC. Office of Aviation Policy and Plans.

FAA AVIATION FORECASTS

Feb. 1992 280 p

(AD-A250412; FAA-APO-92-1) Avail: CASI HC A13/MF A03

This report contains forecasts of aviation activity at Federal Aviation Administration facilities. These include airports with FAA control towers, air route traffic control centers, and flight service stations. Detailed forecasts were made for the major users of the National Aviation System: air carriers, air taxi/commuters, military and general aviation. The forecasts have been prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The lethargy of the domestic and international economies over the past year have caused the aviation industry to experience its worst year ever. However, the outlook for the 12-year forecast period is for moderate economic growth, stable real fuel prices, and moderate inflation. Based on these assumptions, aviation activity by fiscal year 2003 is forecast to increase by 25.7 percent at towered airports, 28.3 percent at air route traffic control centers, and 4.8 percent in flight services performed. Hours flown by general aviation are forecast to increase 15.1 percent and domestic revenue passenger miles (RPM's) are forecast to increase 54.9 percent, with scheduled international RPM's forecast to increase by 112.8 percent and regional/commuter RPM's forecast to increase by 146.5 percent. GRA

N92-29703# National Aerospace Lab., Amsterdam (Netherlands).

ON THE OPTIMIZATION OF WINDSHEAR WARNING AND GUIDANCE SYSTEMS

J. L. SOESMAN 25 Jun. 1990 31 p Presented at the 17th ICAS Congress Student Session, Stockholm, Sweden, 9-14 Sep.

(NLR-TP-90196-U; ETN-92-91440) Avail: CASI HC A03/MF A01

The results of a survey of several investigations into windshear detection, guidance and modeling is presented. The use of the results to improve future windshear warning and guidance systems and wind models for simulation, to obtain safer operation in windshear conditions, is shown. Some natural causes and simple models of windshear are presented and a theoretical analysis on the effect of windshear on performance and flight safety is made. Optimally guided flight trajectories through windshear that are computed in open loop form, using a point mass model, are compared with simulated closed loop suboptimal trajectories. The effect on survivability of different initial conditions and early warnings by forward looking detection systems are discussed. Experiences with an operational reactive windshear warning system aboard aircraft are reported. Natural causes of the shear, pilot's reactions and their result on the flight safety level are discussed.

ESA

N92-30108*# Douglas Aircraft Co., Inc., Long Beach, CA. Airworthiness Assurance Programs.

MAINTAINING THE SAFETY OF AN AGING FLEET OF AIRCRAFT

AMOS W. HOGGARD *In* NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 49-65 Jul. 1992

Avail: CASI HC A03/MF A04

The current status of the Douglas Aging Fleet is examined in light of increasing concern for the possibility of the onset of widespread cracking and recent industry activity to minimize the

concern. A fleet monitoring program together with an augmented maintenance program is proposed as a possible means to reduce the concern. Six candidate options for maintenance program augmentation are examined which have been shown to be effective in detection of widespread fatigue damage. A brief example of how this system might be applied to the DC-9 Fleet is presented.

Author

N92-30123*# Airbus Industrie, Blagnac (France).
AGEING AIRPLANE REPAIR ASSESSMENT PROGRAM FOR AIRBUS A300

J. M. GAILLARDON, HANS-J. SCHMIDT, and B. BRANDECKER In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 283-289 Jul. 1992

Avail: CASI HC A02/MF A04

This paper describes the current status of the repair categorization activities and includes all details about the methodologies developed for determination of the inspection program for the skin on pressurized fuselages. For inspection threshold determination two methods are defined based on fatigue life approach, a simplified and detailed method. The detailed method considers 15 different parameters to assess the influences of material, geometry, size location, aircraft usage, and workmanship on the fatigue life of the repair and the original structure. For definition of the inspection intervals a general method is developed which applies to all concerned repairs. For this the initial flaw concept is used by considering 6 parameters and the detectable flaw sizes depending on proposed nondestructive inspection methods. An alternative method is provided for small repairs allowing visual inspection with shorter intervals. Author

N92-30124*# Federal Express Corp., Memphis, TN. Aircraft Reliability Div.

COMMUNICATION: AN IMPORTANT ELEMENT OF MAINTENANCE AND REPAIR

JAMES S. TRIPP *In* NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 291-299 Jul. 1992 Avail: CASI HC A02/MF A04

People from the airlines, the FAA, and the manufacturers have worked together in an effort to improve the Service Difficulty Reporting system. Their work to date is summarized as follows: (1) design a worldwide reporting system to provide safety alerts to aircraft operators, manufacturers, repair facilities, and regulatory authorities; (2) design a companion system to provide worldwide reliability experience; and (3) overhaul regulatory requirements to be consistent with (1) and (2) to provide information necessary and useful for public consumption.

N92-30128*# Federal Aviation Administration, Seattle, WA. THE FAA AGING AIRPLANE PROGRAM PLAN FOR TRANSPORT AIRCRAFT

DAYTON CURTIS and JESS LEWIS (Federal Aviation Administration, Washington, DC.) In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 321-325 Jul. 1992

Avail: CASI HC A01/MF A04

The Federal Aviation Administration (FAA) Aging Airplane Program is focused on five program areas: maintenance, transport airplanes, commuter airplanes, airplane engines, and research. These programs are complementary and concurrent, and have been in effect since 1988. The programs address the aging airplane challenge through different methods, including policies, procedures, and hardware development. Each program is carefully monitored and its progress tracked to ensure that the needs of the FAA, the industry, and the flying public are being met.

N92-30129*# National Aerospace Lab., Emmeloord (Netherlands).

AGEING AIRCRAFT RESEARCH IN THE NETHERLANDS

J. B. DEJONGE and G. BARTELDS In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and

Structural Airworthiness p 327-335 Jul. 1992 Sponsored in part by FAA and Dept. of Civil Aviation Avail: CASI HC A02/MF A04

The problems of aging aircraft are worldwide. Hence, international cooperative actions to overcome or prevent problems should be taken. The Federal Aviation Administration (FAA) and the Netherlands Civil Aviation Department (RLD) signed a Memorandum of Cooperation in the area of structural integrity, with specific reference to research on problems in the area of aging aircraft. Here, an overview is given of aging research that is going on in the Netherlands. The work described is done largely at the National Aerospace Laboratory; much of the research is part of the forementioned cooperative agreement.

N92-30130*# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

SURVEY OF FRENCH ACTIVITIES CONCERNING STRUCTURAL AIRWORTHINESS AND AGING AIRCRAFT

ROGER LABOURDETTE In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 337-360 Jul. 1992

Avail: CASI HC A03/MF A04

French activities concerning structural airworthiness and aging aircraft are presented. Basic applied research, full-scale testing, teardown inspections, crack initiation, fatigue crack growth, fretting fatigue, non-destructive inspection, and damage tolerance are among the topics covered.

Author

N92-30131*# Department of Transport, Ottawa (Ontario). Airworthiness Branch.

TRANSPORT CANADA AGING AIRCRAFT ACTIVITIES

S. R. DIDRIKSON *In* NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 361-365 Jul. 1992
Avail: CASI HC A01/MF A04

A description is given of recent initiatives undertaken in Canada to address the problems of aging passenger airplanes. In addition to participation in and support of U.S. aging aircraft programs, independent activities were undertaken in such areas as regulatory control of nondestructive testing, aging fleet evaluations, and measures to address the airworthiness of aging Canadian-manufactured airplanes.

Author

N92-30133*# Saab-Scania, Linkoping (Sweden). Aircraft Div. A MANUFACTURER'S APPROACH TO ENSURE LONG TERM STRUCTURAL INTEGRITY

HANS ANSELL, BILLY FREDRIKSSON, and INGVAR HOLM In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 379-405 Jul. 1992

Avail: CASI HC A03/MF A04

The main features of the design concepts for the Saab 340 and Saab 2000 aircraft are described with respect to structural integrity and high reliability. Also described is the approach taken at Saab Aircraft to ensure structural integrity and high reliability. The concepts of global and local loads and sequences, and the fatigue and damage tolerance sizing and their verification are discussed. Also described is quality assurance in the production and structural maintenance program. Structural repair and feedback from operators are also covered.

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

A92-44919 DATA LINK INTEGRATION IN COMMERCIAL TRANSPORT OPERATIONS

WILLIAM H. CORWIN (Honeywell Systems and Research Center, Minneapolis, MN) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 145-153. refs

This paper addresses the issues associated with the interface of the flight crew with Data Link, and the integration of operational functions in commercial transport aircraft. Data Link is used to refer to a variety of air-to-ground communication links in commercial aviation. Within the next few years airlines may be conducting both company business (ACARS and AVPAC) as well as complying with federally regulated air-traffic control (Mode S) using avionic boxes all collectively referred to as Data Links. Operational sequence diagrams will be used to illustrate the effects of different candidate systems, with varying levels of integration, on operator workload.

A92-44920

MODE S DATA LINK PILOT-SYSTEM INTERFACE - A BLESSING IN DE SKIES OR A BEAST OF BURDEN?

MICHAEL C. REYNOLDS and MARK E. NEUMEIER (Midwest Systems Research, Inc., Dayton, OH) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 154-159. refs

Mode S data link is being proposed by the FAA in response to increases in air traffic communications. This paper focuses on the flight deck pilot-interface portion of the system and issues that are included in a datalink human factors research plan currently under development are presented. The research tools that will be utilized to address the data link human factors issues are described.

R.E.P.

A92-44932

THE APPROPRIATE CONCERN FOR POSSIBLE ABERRATIONS IN LANDING GUIDANCE SIGNALS

RICHARD H. MCFARLAND (Ohio University, Athens) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 235-240. refs

The question of how a pilot and his flight might be affected by aberrations and the pilot's concern as to any adverse effects (flight technical error and safety) is discussed. It is maintained that there should be minimal concern, basically no concern, for aberrations affecting the ILS landing guidance signals such that the safety of flight would be downgraded. The long history of no accidents due to out-of-tolerance ILS facilities is a prime justification for drawing this conclusion.

A92-44969

REAL TARGETS, UNREAL DISPLAYS - THE INADVERTENT SUPPRESSION OF CRITICAL RADAR DATA

THOMAS G. LUSCH (FAA, Oberlin, OH) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 460-465. refs

In today's Air Route Traffic Control Center (ARTCC) environment, some very important low-altitude radar data is suppressed. This radar data is not suppressed by the controllers themselves. Rather, it is a result of a compromise in the radar data processing software, and the manner in which the software is adapted by automation personnel. This suppressed radar data

has led to air traffic controllers being unable to provide accurate and timely advisories about aircraft which pose a collision threat. An existing software technique to correct a portion of this problem has existed for years, but it is optional and is not adapted system-wide. There must be a concerted effort to address the inadvertent suppression of low-altitude radar data, as well as an examination into the human factors aspect of why it is allowed to continue.

A92-45373

SELECTED MODELS OF AIRCRAFT NAVIGATION SPACE [WYBRANE MODELE SRODOWISKA NAWIGACYJNEGO LOTU]

STEFAN BRAMSKI and JERZY GRAFFSTEIN (Instytut Lotnictwa, Warsaw, Poland) Instytut Lotnictwa, Prace (ISSN 0509-6669), no. 128, 1992, p. 16-37. In Polish. refs

A method for modeling aircraft navigation space is presented for use in a ground situated laboratory modeling aircraft flight dynamics, drive systems and aeronautical equipment. Principles of mapping the geoid, the basic pressure distribution on the ground surface, parameter changes in the function of flight altitude under various climatic conditions, as well as modeling three components of atmospheric turbulence, the distribution of ground based radio navigation means, and the visibility of orientation objects on the ground for visual navigation have been accepted as essential elements of modeling the navigation space.

A92-47511

AIRBORNE/SHIPBORNE PSK TELEMETRY DATA LINK

JOHN R. CARLSON (Aydin Corp., Computer and Monitor Div., Horsham, PA) and ARLEN SCHMIDT (Intera Systems, Inc., Calgary, Canada) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 137-147. Copyright

Design considerations and methodology applied to solve the practical problems involved in the creation of a high bit rate telemetry relay system are examined. The system discussed has been designed to operate as a data link for an airborne SAR imaging system used for support of navigation through ice in Canadian waters. The use of convolutional and differential encoding, scrambling, and judicious antenna choices establish a reliable data link at small grazing angles over ice at ranges well in excess of 200 nautical miles. The principal performance characteristics of the system are given.

A92-47566

GLOBAL POSITIONING SYSTEM TELECOMMAND LINK

DANIEL F. ALVES, JR. (Alpha Instrumentation and Information Management, Santa Maria, CA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 743-749. Copyright

The Global Positioning System of satellites and pseudosatellite ground stations (GPS) is designed to provide very accurate time, space, and position information and to additionally provide a telecommand link. The existing L-band RF link is designed so that it can carry command information, when required, as well as TSPI information.

Author

A92-47574

AIRBORNE DATA ACQUISITION AND RELAY SYSTEM

ALLAN NETZER (USAF, Hill AFB, UT) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 809-818. refs Copyright

The telemetry-tracking and relay capabilities of the Surrogate Carrier Launch Platform (SCLP) aircraft using the Airborne Data Acquisition and Relay System (ADARS) station are discussed. The ADARS uses a combination of tracking and omnidirectional

antennas to acquire, track, record, and retransmit telemetry data. The configuration of the ADARS system and its performance are described, as are some planned improvements to the system.

V.L.

A92-47630

COMPUTER-CONTROLLED NAVIGATION SYSTEM/GENERAL POSITIONING SYSTEM (CCNS/GPS) - A GUIDANCE, POSITIONING, AND MANAGEMENT SYSTEM FOR REMOTE SENSING FLIGHTS [COMPUTER-CONTROLLED NAVIGATION SYSTEM/GENERAL POSITIONING SYSTEM /CCNS/GPS/-EIN FUEHRUNGS-, POSITIONIER- UND

MANAGEMENTSYSTEM FUER FERNERKUNDUNGS-FLUEGE]ALBRECHT GRIMM Ortung und Navigation (ISSN 0474-7550), no. 1, 1992, p. 89-99. In German. refs

The requirements for computer and GPS-controlled sensing flight are reviewed. The realization of these requirements using the system CCNS Computer-Controlled Navigation System is demonstrated with examples.

A92-47631

CONSTRUCTION OF A REAL-TIME DGPS EXPERIMENTAL SYSTEM [AUFBAU EINES

ECHTZEIT-DGPS-EXPERIMENTALSYSTEMS]

T. MUELLER, M. POPPE, H. ROHLING (Braunschweig, Technische Universitaet, Federal Republic of Germany), C. MEIER, K. KLEIN (DLR, Cologne, Federal Republic of Germany), and F. HEIMBERG (Hannover, Universitaet, Hanover, Federal Republic of Germany) Ortung und Navigation (ISSN 0474-7550), no. 1, 1992, p. 101-105. In German. refs

An experimental system constructed for the purpose of studying the DGPS (Differential Global Positioning System) system behavior and for transmitting correction data in an airport environment is described. Preliminary qualitative results from applying the system are summarized.

C.D.

A92-48308

TIME-TO-GO ESTIMATION FROM INFRARED IMAGES

K. C. MARKHAM (British Aerospace /Defence Systems/, Ltd., Bristol, England) IEE Proceedings, Part I: Communications, Speech and Vision (ISSN 0956-3776), vol. 139, no. 3, June 1992, p. 356-363. refs Copyright

The problem of an aircraft flying toward a rendezvous point using passive image data to calculate the flight duration is considered. A technique is described which estimates time-to-go from a sequence of infrared images by applying a generalization of a conventional correlation process. The method relies on measurements from a multiple point correlation tracker, which is able to track a landmark or object. It is shown that a difference squared correlator is equivalent to the measurement equation of a parameter estimation scheme with tracking offsets as states. A simple relative motion model is postulated which uses magnification, rotation and translation, with the instantaneous measure of time-to-go related to the magnification scale factor. A series of experiments using simulated data is detailed and the results are discussed. In the latter stages of flight, the time-to-go estimates are shown to give acceptable results for many applications. Author

A92-48416

MOTION ERRORS IN AN AIRBORNE SYNTHETIC APERTURE RADAR SYSTEM

STEFAN BUCKREUSS (DLR, Institut fuer Hochfrequenztechnik, Oberpfaffenhofen, Federal Republic of Germany) European Transactions on Telecommunications and Related Technologies (ISSN 1120-3862), vol. 2, no. 6, Nov.-Dec. 1991, p. 655-664. refs

Copyright

An approach is demonstrated whereby the effects of motion induced phase errors on SAR image quality are determined statistically. The expected image quality can be predicted if the power spectral density (PSD) is measured with an inertial

measurement unit (IMU) strapdown system. The required accuracy of an IMU for SAR motion compensation is represented by the PSD of the tolerable uncompensated motion error. The determination of the PSD and the IMU transfer function are described.

A92-48470

AUTONOMOUS LANDING - FUNCTIONAL REQUIREMENTS

KEITH FITSCHEN and ANDY ZEMBOWER (IIT Research Institute, Chicago, IL) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 374-381. Copyright

For military aviation, an autonomous landing (AL) capability is sought to enable operations out of landing fields which are battle-damaged, or have less than adequate approach aids or lighting. The authors focus on an AL capability for future transport and special operations aircraft. Attention is given to AL requirements, the satisfaction of approach requirements, vision systems, and functional capability requirements.

A92-48480

LOCATION AND TRACKING TECHNIQUE IN A MULTISTATIC SYSTEM ESTABLISHED BY MULTIPLE BISTATIC SYSTEMS

LI X. HE and ZHONGKANG SUN (National University of Defense Technology, Changsha, People's Republic of China) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 437-441. refs
Copyright

The authors present the detailed derivation of the WMEKF (weighted modified extended Kalman filter) algorithm for a bistatic system, in which the passive observer measures the azimuth, elevation, and time difference. A unique multistatic system composed of netted-distatic systems is proposed. The processed results at each bistatic system are sent over a communication network to a central processor and processed with the WLS (weighted least sequence) algorithm. The tracking performance of the multistatic system is evaluated by means of the Monte Carlo simulation technique.

N92-28718*# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.

LORAN-C PERFORMANCE ASSURANCE ASSESSMENT PROGRAM Final Report

ROBERT W. LILLEY and N. KENT BROOKS Jun. 1992 36 p. (Contract NAG1-816)

(NASA-CR-190469; NAS 1.26:190469; OU/AEC-EER-92-2) Avail: CASI HC A03/MF A01

The Federal Aviation Administration (FAA) has accepted the Loran-C navigation system as a supplemental navigation aid for enroute use. Extension of Loran-C utilization to instrument approaches requires establishment of a process by which the current level of performance of the system is always known by the pilot. This system 'integrity' translates into confidence that, if the system is made available to the pilot, the guidance will be correct. Early in the consideration of Loran-C for instrument approaches, the Loran-C Planning Work-Group (LPW) was formed with membership from the FAA, the US Coast Guard, various state governments, aviation users, equipment manufacturers and technical experts. The group was hosted and co-chaired by the National Association of State Aviation Officials (NASAO). This forum was ideal for identification of system integrity issues and for finding the correct process for their resolution. Additionally, the Wild Goose Association (WGA), which is the international Loran-C technical and user forum, regularly brings together members of the FAA, Coast Guard, and the scientific community. Papers and discussions from WGA meetings have been helpful. Given here is a collection of the issues in which Ohio University became involved. Issues definition and resolution are included along

recommendations in those areas where resolution is not yet complete. Author

N92-29103*# National Aeronautics and Space Administration.

Ames Research Center, Moffett Field, CA.

A ROTORCRAFT FLIGHT DATABASE FOR VALIDATION OF VISION-BASED RANGING ALGORITHMS

PHILLIP N. SMITH Apr. 1992 17 p

(Contract RTOP 505-64-36)

(NASA-TM-103906; A-92021; NAS 1.15:103906) Avail: CASI HC A03/MF A01

A helicopter flight test experiment was conducted at the NASA Ames Research Center to obtain a database consisting of video imagery and accurate measurements of camera motion, camera calibration parameters, and true range information. The database was developed to allow verification of monocular passive range estimation algorithms for use in the autonomous navigation of rotorcraft during low altitude flight. The helicopter flight experiment is briefly described. Four data sets representative of the different helicopter maneuvers and the visual scenery encountered during the flight test are presented. These data sets will be made available to researchers in the computer vision community.

N92-29605# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

EUROPEAN STUDIES TO INVESTIGATE THE FEASIBILITY OF USING 1000 FT VERTICAL SEPARATION MINIMA ABOVE FL 290. PART 1: OVERVIEW OF ORGANISATION, TECHNIQUES EMPLOYED, AND CONCLUSIONS

J. M. TENHAVE, M. E. COX (Eurocontrol Agency, Brussels, Belgium), and D. A. FORRESTER (Meteorological Office, Bracknell, England) 18 Feb. 1991 27 p Submitted for publication (NLR-TP-91062-U-PT-1; ETN-92-91454) Avail: CASI HC A03/MF A01

Primarily in response to airline pressures for fuel economies, International Civil Aviation Organization (ICAO) established a study program to determine the feasibility of having the Vertical Separation Minimum (VSM) used above FL 290 to 1000 ft. The first of a three part article describing a European contribution to this program is presented. The aims and organization of the experimental work are outlined, the choice of methodology available to measure height keeping errors is described, and an indication of the measurement accuracy achieved is given. Overall, the work shows that, whereas it would be feasible to introduce a 1000 ft. VSM in the North Atlantic region, other measures would be necessary before it could be used in continental airspace. Today, in certain areas, the need for a reduced VSM has become even more pressing in order to achieve the gains in airspace capacity necessary to handle rapidly growing volumes of air traffic.

N92-29615# National Aerospace Lab., Amsterdam (Netherlands). Electronics Dept.

APPLICATION OF VME-TECHNOLOGY ON AN AIRBORNE DATA LINK PROCESSOR UNIT

P. J. H. M. MANDERS 6 Jun. 1988 15 p Presented at the VITA Conference on VME Bus in Research, Zurich, Switzerland, Oct. 1988

(NLR-MP-88040-U; ETN-92-91513) Avail: CASI HC A03/MF A01
The technical concept of a Data Link Processor Unit (DLPU),
which is a five slot, VME based, computer system, is described.
In civil aircraft the DLPU will interface a secondary surveillance
radar mode select transponder with various avionics systems in
order to support data link operations. A militarized 68020 processor
board will be applied. The interfaces with the transponder and the
avionic systems apply a 68000 microprocessor for handling the
lower level protocols. Electrically the interfaces with the aircraft
systems follow the ARINC specification 429. The requirements for
volume, environment, performance and certification are described.
The application of the VME bus technology made possible the
use of standardized boards and application standardized methods
for the multiprocessor communication.

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

A92-45304* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

JET-POWERED V/STOL AIRCRAFT - LESSONS LEARNED

SETH B. ANDERSON (NASA, Ames Research Center, Moffett Field, CA) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.1.1-II.1.14. refs

Copyright

Over the years a variety of jet-powered V/STOL aircraft were studied in test facilities and flight. The tests disclosed several fundamental limitations: (1) lack of design features conducive to good STOL performance, (2) inadequate performance margins and poor handling qualities, (3) performance and handling qualities degradation due to propulsion system induced flow and ground effect, and (4) inadequate integration of flight control and propulsion systems. The purpose of this paper is to review the lessons learned from tests of jet V/STOL aircraft in key technology areas including: (1) aerodynamic/performance tradeoffs, (2) unique propulsion requirements and induced flow effects, (3) handling qualities, and (4) operating procedures. The sensitivity of current ASTOVL designs to meet requirements in these critical technology area is examined.

A92-45305

HARRIER INTERNATIONAL PROGRAMME

H. I. PHILLIPS (McDonnell Aircraft Co., Saint Louis, MO) and M. S. SHARLAND (British Aerospace /Military Aircraft/, Ltd., Preston, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.2.1-II.2.11. refs Copyright

The evolution of the power lift vectored thrust concept as depicted by the Harriet aircraft program is reviewed, with emphasis on the Harrier II, a second-generation vectored thrust V/STOL aircraft. The aircraft has an all-weather day/night capability and is operated in both close air support and air defense roles from ships, dispersed sites and paved and unpaved runways. The aircraft uses essentially the same Pegasus vectored thrust turbofan, albeit uprated to 21,750 lb static thrust, that powered earlier Harrier designs. Significant improvements in V/STOL performance that were made through improved aerodynamic design are addressed. Major AV-8B configuration changes are illustrated. C.A.B.

A92-45308

MILITARY UTILITY OF MEDIUM SPEED V/STOL DESIGNS

LISA COWLES (U.S. Navy, Naval Air Development Center, Warminster, PA) and MARK J. WILLIAMS (McDonnell Aircraft Co., Saint Louis, MO) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.6.1-II.6.19. refs Copyright

Recent design concepts for medium-speed V/STOL aircraft are reviewed, and the unique military utility that this class of aircraft offers is discussed. Primary emphasis is placed on naval applications, and the applicability of medium-speed V/STOL aircraft in Navy, Air Force, and Marine Corps operations is addressed. In Navy service these concepts offer the prospects of allowing highly capable ASW and AEW aircraft to be deployed from a variety of non-CV platforms. In Air Force service MS/V/STOL aircraft corp provide significant advance in reaction times for search and rescue missions. Larger medium-speed V/STOL aircraft combine range, speed, and payload with vertical landing capability to provide an ideal special operations aircraft. In Marine Corps Service medium-speed STOL aircraft are ideal complements to their

V/STOL fighters and helicopters as the Corps moves toward its goal of an all-V/STOL force. Potential missions range from transport to early warning/command-control-communications to observation and attack.

C.A.B.

A92-45310

A USAF ASSESSMENT OF STOVL FIGHTER OPTIONS

D. L. HAMMOND, R. E. FREDETTE, G. C. TAMPLIN, and R. L. ASHBY (USAF, Wright Research and Development Center, Wright-Patterson AFB, OH) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.8.1-II.8.12. Copyright

The paper examines the recent efforts of the USAF Wright Research and Development Center's efforts to define the key attributes of a possible STOVL fighter so that the technology base could be developed to make an operational aircraft a possibility by the year 2005. The goal was to evaluate whether STOVL, super-cruise, supermaneuverability, and low observables are compatible. It was found that the choice of the maximum allowable exhaust gas temperature in ground-effect has a pronounced effect on the ranking of the powered lift concepts. Technology programs were initiated to help solve some design-related problems such as lift engine design and advanced STOVL control concepts.

C.A.B.

A92-45311

EVOLUTION OF ASTOVL AIRCRAFT DESIGN

J. T. PLATT, K. AINSCOW, and G. STOTT (British Aerospace /Military Aircraft/, Ltd., Preston, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.10.1-II.10.1.14. Copyright

Attention is given to the evolution of an ASTOVL vehicle with Harrier-like powered lift operation which satisfies the requirement of combining the STOVL advantages into a single viable engine airframe configuration without compromising operational effectiveness. This is achieved by incorporating a novel Rolls Royce engine design which provides low specific thrust for benign operations during powered lift and high specific thrust for conventional agile supersonic flight. The configuration drivers and design compromises are identified and discussed. STOVL and CTOL aircraft configurations with and without powered-lift constraints are illustrated.

A92-45312

ASTOVL PROPULSION SYSTEMS CONFIGURATION AND CONCEPT CHOICE

N. A. MITCHELL (Rolls-Royce, PLC, London, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.11.1-II.11.10. Research supported by Ministry of Defence Procurement Executive. refs

Copyright

Studies conducted in the 1980s by Rolls Royce to test a wide variety of ASTOVL propulsion concepts against a number of different customer requirements including NST6464 and the operational targets of the studies carried out under the auspices of the U.S./U.K. Memorandum of Understanding are reviewed, with particular reference to those aspects which affect concept choice and the quality of the overall system. The key elements of this propulsion system are that in the STOVL regime the system is unmixed and has the characteristics of the Pegasus (i.e., cool front jets and full nozzle vectoring) but is a mixed flow afterburning turbofan in the flight regime. The critical technologies for this propulsion system are identified, and the programs required to underwrite them are outlined. The major characteristics of this propulsion system are compared with other systems, and those elements which contribute to a low-risk propulsion system are identified. C.A.B.

A92-45313* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

LARGE-SCALE WIND TUNNEL STUDIES OF A JET-ENGINED POWERED EJECTOR-LIFT STOVL AIRCRAFT

MICHAEL R. DUDLEY, BRIAN E. SMITH, VICTOR CORSIGLIA, and DALE L. ASHBY (NASA, Ames Research Center, Moffett Field, CA) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.1.1-III.1.10. refs

A full-scale model of a supersonic STOVL single engine flighter aircraft employing an ejector to augment lift in hover and in low-speed flight was tested in the 40- by 80-ft and 80- by 120-ft test sections of the National Full-Scale Aerodynamics Complex located at the NASA Ames Research Center. The measured ejector augmentation ratio in hover met the design requirement of 1.6 and continued to provide the lift necessary in forward flight for good transition qualities. The up-and-away aerodynamics (ejector system stowed) were found to be conventional for this class of vehicle. The pitch control provided by the full-span blown flaps is sufficient to control the large pitching moments generated by ventral exhaust nozzle vectoring and propulsion induced aerodynamic effects such as the turning of the flow entrained into the ejectors.

Author

A92-45315

CONFIGURATION EFFECTS ON THE INGESTION OF HOT GAS INTO THE ENGINE INTAKE

P. G. KNOTT (British Aerospace / Military Aircraft/, Ltd., Preston, England) and C. M. MILFORD (British Aerospace / Military Aircraft/, Ltd., Kingston-upon-Thames, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.3.1-III.3.13. refs Copyright

The ingestion of hot engine exhaust gas into the engine air intakes of combat aircraft which use jet lift to enable the aircraft to perform V/STOL is discussed. The effect of configuration variables on hot gas ingestion (HGI), with respect to the intake air temperature rise dependence in space and time, is discussed. It is concluded that development of the Harrier family should use low-temperature fan air front jets in vertical operation in ground effect. The HGI level can then be controlled by the use of CADs and modest splay angles. Side-by-side two-poster jet lift systems are proposed. It is concluded that it is very difficult to achieve low levels of HGI with this arrangement.

A92-45381

THE HIGH SPEED CHALLENGE FOR ROTARY WING AIRCRAFT

EVAN A. FRADENBURGH (Sikorsky Aircraft, Stratford, CT) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 91-109. refs

(SAE PAPER 911974) Copyright

This paper reviews the problems associated with developing a vertical takeoff and landing (VTOL) aircraft that has desirable helicopter-like attributes in hover and low-speed operation but is capable of efficient high subsonic cruise speed. A number of different configurations are reviewed, and an assessment is made of the relative probabilities of future success. Factors considered to be important discriminators include speed potential, disk loading, empty weight fraction, the need for supplementary propulsion systems or convertible engines, and technical risk. The tilt-rotor configuration has considerable merit but will not achieve the highest speeds desired. It is concluded that incorporation of variable geometry, in the form of a variable diameter rotor system, has the best chance of providing the 'ideal' VTOL. The variable diameter tilt-rotor adds on the order of 100 knots to the speed potential of the tilt-rotor and provides numerous other benefits as well. For highest speeds, the variable-diameter single stowed rotor configuration has the desired combination of attributes.

A92-45383

HIGH SPEED VSTOL ON THE HORIZON - THE ANSWER TO CONGESTION?

WILLIAM F. CHANA (William F. Chana Associates, Inc., San Diego, CA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 121-130. refs (SAE PAPER 911976) Copyright

A review of design issues and factors relating to the tilt-wing and tilt-rotor aircraft is presented. Demonstrator vehicles have shown that tilt-wing and tilt-rotor aircraft can meet performance requirements. Advances in materials, propulsion, avionics and flight controls places aeronautical technology on the threshold of practical and cost effective high-speed VSTOL aircraft. R.E.P.

A92-45387

THE FATIGUE SCATTER FACTORS AND REDUCTION FACTORS IN THE DESIGN OF AIRCRAFT AND HELICOPTER'S STRUCTURAL LIVES

FU-ZE ZHANG (Beijing University of Aeronautics and Astronautics, People's Republic of China) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 173-178. refs (SAE PAPER 911984) Copyright

It is shown that, in the design of aircraft and helicopter structural lives, the fatigue scatter factors can be classified into scatter factors for fatigue testing and those for theoretical computations. Each type of fatigue scatter factors can also be divided into scatter factors for crack-initiation lives and those for crack-growth lives. The values of different types of scatter factors and various formulas used for calculations are examined and compared. The feasibility of using a unified formula for calculating scatter factors and reduction factors is discussed.

A92-45396

AN ACROBATIC AIRSHIP 'ACROSTAT'

MASAHIKO ONDA and YASUSHI MORIKAWA (MITI, Mechanical Engineering Laboratory, Tsukuba, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 269-273. (SAE PAPER 911994) Copyright

A novel type of airship or a powered LTA aircraft is proposed which is designed with a rather conventionally shaped hull and with conventional thrusters and is not made as a control configured vehicle nor does it utilize any sophisticated control mechanism. None of the control surfaces are installed but couples of stabilizers equipped to the aft hull, and without any active control tricks the vehicle holds its stability and realizes enhanced maneuverability performances. This newly conceived type model is named Acrostat. This airship can ascend and descend vertically and can perform somersaults, spiral flights, and rotates around its CG as the center of the movement. The paper deals with the structural design concept of the model, design data, and the attitude control principle.

A92-45397

DUCTED FAN VTOL FOR WORKING PLATFORM

SHOHEI NIWA and MASAYUKI SUZUKI (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 275-285. refs (Contract MOESC-62850016)

(SAE PAPER 911995) Copyright

An automatic flight control system is designed for research models of remotely piloted ducted fan VTOL. Special attention is given to the study of control problems which would arise when the VTOL is used as a high-position working platform. Among these problems are the application of two time scale control theory

for the feedback control system design, and the application of Kalman filter theory to process sensor data.

A92-45406

RESULTS AND LESSONS LEARNED FROM THE STOL AND MANEUVER DEMONSTRATION PROGRAM

DAVID J. MOORHOUSE and JAMES A. LAUGHREY (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 365-373. refs (SAE PAPER 912005) Copyright

(SAE PAPER 912005) Copyright

The STOL and Maneuver Technology Demonstrator Program has validated a set of technologies that give a surpersonic fighter all-weather STOL performance while also enhancing up-and-away maneuverability. Significant reductions in both takeoff and landing distances, compared with the unmodified F-15, have been measured. The additional pitch control power of thrust vectoring has been demonstrated up to 30 deg angle of attack. The effectiveness of up-and-away reversing has been identified. First, major flight test results are presented, and then lessons learned from this integration program are discussed.

Author

A92-45410

AERODYNAMIC DEVELOPMENT OF BOUNDARY LAYER CONTROL SYSTEM FOR NAL QSTOL RESEARCH AIRCRAFT 'ASKA'

HIROTOSHI FUJIEDA, HITOSHI TAKAHASHI, YOSHIT MIYAMOTO (National Aerospace Laboratory, Chofu, Japan), JUNICHI MIYASHITA, KENJI SAKAI (Kawasaki Heavy Industries, Ltd., Kobe, Japan), and YOSHIO MORITA (Mitsubishi Heavy Industries, Ltd., Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 405-412. refs (SAE PAPER 912010) Copyright

ASKA, developed by National Aerospace Laboratory, is a quiet short take-off and landing (QSTOL) research aircraft adopting upper surface blowing concept as a powered high lift system. To achieve sufficient STOL performance by augmenting stall angle of attack and roll control power, a blowing BLC technique was applied to the outboard leading edges and ailerons. To supply high pressure air to save the BLC piping space, a BLC system which was fit for using high-pressure air was developed. The BLC system, in which BLC air is discharged by a series of discrete jets from small drilled holes (0.8 to 3.0 mm in diameter) arranged in a row, is one of the unique features of the aircraft. In this paper, the summary of the aerodynamic development of the BLC system is presented except for the air piping system.

A92-45436

FEASIBILITY STUDY ON A MICROWAVE-POWERED UNMANNED AERIAL VEHICLE FOR THE COMMUNICATION RELAY UTILIZATION

KINGO TAKASAWA (National Aerospace Laboratory, Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 665-676. refs (SAE PAPER 912052) Copyright

Some component tests and a system definition study have verified the feasibility of microwave powered UAVs for communication relay utilization. The best choice of a power system composition is proposed with emphasis placed on the overall efficiency in cruise phase and adaptability in the climb phase. The integration into the ATC system, towed climb, monitored descent and emergency operations are described.

R.E.P.

A92-45437

STRUCTURAL CONCEPT OF MAIN WINGS OF HIGH ALTITUDE UNMANNED AERIAL VEHICLE AND BASIC PROPERTIES OF THERMOPLASTIC COMPOSITES AS CANDIDATE MATERIAL

TAKASHI ISHIKAWA, YOICHI HAYASHI, **MASAMICHI** MATSUSHIMA (National Aerospace Laboratory, Tokyo, Japan), TATSUO SATO (Fuji Heavy Industries, Ltd., Tochigi, Japan), and KINGO TAKASAWA (National Aerospace Laboratory, Chofu, IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 677-686. refs (SAE PAPER 912053) Copyright

A conceptual design of an unmanned aerial vehicle operated at an altitude of 20 km and powered by microwave was developed using CAD software. Possible applications of this aircraft would be a platform for telecommunication relay or an earth observation base. It is found that an all-up mass of 400 kg would provide an optimal payload of 50 kg under certain input power conditions, and that an extreme weight reduction, such as a 93-kg main wing of 30-m span, would be required. A fundamental structural concept of this aircraft, particularly the main wing, is defined. Maneuvering envelopes are discussed and basic flight loads are determined. The spanwise thickness distribution of the tubular spar is calculated, and bending and torsional deflections are estimated. Static and fatique tensile tests are conducted at an ambient temperature and a low temperature of -60 C for CF/PEEK specimens. C.A.B.

A92-45438

HIGH-ALTITUDE LIGHTER-THAN-AIR POWERED PLATFORM

MASAHIKO ONDA and YASUSHI MORIKAWA (MITI, Mechanical Engineering Laboratory, Tsukuba, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 687-694. refs (SAE PAPER 912054) Copyright

To tackle global environmental problems, the acquisition of plentiful and precise data is necessary, and a means of conducting long-lasting high-resolution measurements over broad areas is required. A feasibility study has been made on a high-altitude (about 20 km), superpressured, helium-filled powered lighter-than-air (PLTA) vehicle as an ideal platform for environmental observation. It has a long service life and carries a larger payload than an artificial satellite. This PLTA platform, named HALROP (High Altitude Long Range Observational Platform), uses a solar-powered electric propulsion system to maintain its position in space against wind currents. The solar power is acquired from solar cells. For night use, solar energy is stored in regenerative fuel cells. This study examines energy balance and provides a structural analysis of the vehicle.

A92-45439

EXPERIMENTAL AND NUMERICAL STUDY OF AERODYNAMIC CHARACTERISTICS FOR SECOND GENERATION SST

KENJI YOSHIDA and KENJI HAYAMA (Kawasaki Heavy Industries, Ltd., Kakamigahara, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 695-707. Research supported by Kawasaki Heavy Industries, Ltd. refs

(SAE PAPER 912056) Copyright

Attention is given to the effects of three typical drag reduction technologies, namely, the application of a suitable wing planform, a warped wing, and an area-ruled body by employing both experimental and numerical approaches. The increment of the cruise L/D is about 0.1 for an arrow planform, 0.6 for a warped wing, and 0.5 for an area-ruled body. It is inferred that the present SST configuration has an L/D of about 8.6 at cruise Mach number 2.0, including some corrections on the Reynolds number, fuselage volume, etc. Applying the present Navier-Stokes calculation code for these test models, it is found that the CFD code is very useful in predicting the characteristics of design conditions.

DEVELOPMENT OF THE DDV ACTUATION SYSTEM ON THE **IDF AIRCRAFT**

YEN-NIEN HSU, CHEN-YAN LAI, MING-HWANG HSU, and

YUN-KUN LEE (Chung Shan Institute of Science and Technology, IN: International Pacific Air and Space Republic of China) Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 871-881. (SAE PAPER 912080) Copyright

Consideration is given to the problems and challenges of designing the closed-loop electronic control of a direct drive valve (DDV) actuator system. Advantages and disadvantages of the DDV concept compared to the electrohydraulic valve EHV are outlined. Loop closer servoamplifier design, failure monitoring, current equalization, and testability of the DDV are also discussed. The Taiwanese Indigenous Defensive Fighter is the testbed for the design, integration, and testing of one such DDV system. The DDV driven actuators have exhibited reliable high-performance flight-test operation. Recent improvements include more complete DDV modeling information, allowance for overtravel, and surface rigging.

A92-45491# TWO-POINT OPTIMIZATION OF COMPLETE THREE-DIMENSIONAL AIRPLANE CONFIGURATION

K. KUBRYNSKI (Warsaw, Technical University, Poland) Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 172-180. refs (AIAA PAPER 92-2618) Copyright

A subcritical panel method applied to flow analysis and aerodynamic multipoint design of complex aircraft configurations is presented. The analysis method is based on linearized, compressible, subsonic flow equations and indirect Dirichlet boundary conditions. Quadratic doublet and linear source distribution on flat panels are applied. In the case of aerodynamic design the geometry which minimizes discrepancy between target and actual pressure distributions on different parts of configuration at different angles of attack is found iteratively using numerical optimization technique. Geometry modifications are modeled by surface transpiration. Constraints in respect to resulting geometry can be specified. Examples of 3D design are presented. The software is adopted to personal computers, and as a result an unexpected low cost of computations is obtained. Author

A92-45501# EFFECTS OF WING PLANFORM ON HSCT OFF-DESIGN **AERODYNAMICS**

C. P. NELSON (Boeing Commercial Airplane Group, Seattle, WA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 285-303, refs

(AIAA PAPER 92-2629) Copyright

Wing planforms for high-speed civil-transport (HSCT) aircraft are considered with attention given to off-design performance and flight characteristics. A review is given of the aerodynamics of supersonic planforms detailing key subsonic-transonic flow phenomena including those corresponding to high angles of attack. Three HSCT wing-body planforms are compared to study the off-design impact of strake size as well as the effects of inboard leading-edge bluntness. The three configurations include wings with 35, 50, and 60 percent strake with different sweep designs. Scale models are used in a wind tunnel at Mach numbers of 0.40-1.05 to test such conditions as transonic overland cruise, acceleration, holding/diversion, and maneuvering at high angles of attack. The best performance is demonstrated by the 'cranked-arrow' wing with blunt inboard wing sections and moderate outboard sweep. C.C.S.

A92-45519# RECENT CFD APPLICATIONS ON JET TRANSPORT **CONFIGURATIONS**

B. C. CLEM, J. K. ELLIOTT, T. L. B. TAMIGNIAUX, and E. N. TINOCO (Boeing Commercial Airplane Group, Seattle, WA) AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 486-493. refs (AIAA PAPER 92-2658) Copyright

The application of two full-potential codes with coupled boundary layer (A488 and TRANAIR) to two- and four-engine configuration is presented. It is concluded that both A488 and TRANAIR exhibit good agreement with test data, especially on the inboard portion of the wing where aeroelastic effects are not as strong. These codes are capable of providing timely, high quality CFD solutions on 'real world' problems and geometries.

A92-45573#

APPLICATION OF THE EULER METHOD EUFLEX TO A FIGHTER-TYPE AIRPLANE CONFIGURATION AT TRANSONIC

S. HEISS, A. EBERLE, L. FORNASIER, and W. PAUL (MBB GmbH, Munich, Federal Republic of Germany) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 19 p. Research supported by MBB GmbH. refs (AIAA PAPER 92-2620) Copyright

The paper reports the application of the finite volume Euler method EUFLEX to an advanced fighter airplane configuration using an H-type monoblock grid topology. Comparisons of the numerical results with wind tunnel data both in terms of global aerodynamic coefficients and of wing-surface pressures are used to assess the capabilities of the present approach in the analysis of complex flow phenomena experienced by the aircraft throughout its flight envelope. Investigated phenomena include flow nonlinearities induced by the highly swept delta wing at moderate to high angles of attack and by recompression shocks at transonic and supersonic speeds, and interference flows due to wing-canard coupling, underwing pylon-missile installation close to wing tip pod and propulsion effects. In addition, trailing-edge flap deflection is simulated using a novel local grid topology. A description of the Euler solver is provided and the interactive technique used to generate the numerical grid directly from the CAD model of the configuration is presented. Selected results for Mach numbers 0.60, 0.90, 1.20 and 1.30 are discussed. Author

A92-45580# APPLIED COMPUTATIONAL AERODYNAMICS - CASE

W. H. MASON (Virginia Polytechnic Institute and State University, Blacksburg) AlAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 13 p. refs (AIAA PAPER 92-2661) Copyright

Case studies of current aircraft are used as term projects in a senior elective course at VPI, Applied Computational Aerodynamics. The case studies illustrate the role of computational aerodynamics in aircraft design and analysis. The objective is to connect classroom instruction to actual current aerodynamic concepts and configuration development. Students have shown considerable interest in these projects. The paper discusses a sampling of the projects that have been used over the past several years. They include: the B-2, a comparison of the Beech Starship and the Grumman X-29, and a comparison of the YF-22 and YF-23 ATF candidates. The paper presents highlights from the term projects, including the key lessons learned from the analysis of the design. Author

A92-46800

SYSTEM FOR GENERATING SEQUENCES OF PHASED GUST OR TAXI LOADINGS

ROBERT G. EASTIN, TRYGVE R. LERWICK, and SVEN M. SOEDEL (McDonnell Douglas Corp., Long Beach, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 686-692. refs (Contract F33657-81-C-2108)

Copyright

A method is presented for Monte Carlo generation of phased load conditions for multiple loading durability testing. These load are consistent with the gust environmental-dynamic model used in aircraft design. Time histories of individual loads from sequences of load conditions are consistent with the load sequences used in standard single load point durability and damage tolerance testing and analysis. Truncation can be applied to a sequence of load conditions so that only the most severe are retained. The truncation process is consistent with the mission analysis approach to design and to durability and damage tolerance. The load conditions can be modified using an induced autocorrelation approach to give variation in the number of zero crossings of the load time histories.

A92-46806

OPTIMUM CRUISE LIFT COEFFICIENT IN INITIAL DESIGN OF JET AIRCRAFT

RODRIGO MARTINEZ-VAL and EMILIO PEREZ (Madrid, Universidad Politecnica, Spain) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 712-714. refs

An attempt is made to develop a more realistic model of the optimum cruise of a jet aircraft by considering the effect of the Mach number on the specific fuel consumption. It is assumed that the specific fuel consumption is influenced by the Mach number in accordance with a potential law, which, along with the constant altitude constraint, allows a simple analytical treatment of the range equation and related expressions. The final results are written in closed form. An application of the results to performance prediction is illustrated.

A92-46807

ADVANCED PNEUMATIC IMPULSE ICE PROTECTION SYSTEM (PIIP) FOR AIRCRAFT

CHARLES A. MARTIN and JAMES C. PUTT (BF Goodrich Aerospace, Uniontown, OH) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 714-716. Previously cited in issue 06, p. 763, Accession no. A90-19875. refs Copyright

A92-46812

WING MASS FORMULA FOR SUBSONIC AIRCRAFT

SERGEI V. UDIN and WILLIAM J. ANDERSON (Michigan, University, Ann Arbor) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 725-727. refs Copyright

A new formula for estimating the wing mass is derived, and detailed calculations are presented for a transport aircraft. The formula is shown to be accurate to within -10.8/+9.5 percent; the rms error is 5.9 percent. The accuracy of the formula can be improved by using statistical data.

A92-46813

WHIRL-FLUTTER STABILITY OF A PUSHER CONFIGURATION IN NONUNIFORM FLOW

F. NITZSCHE and E. A. RODRIGUES (EMBRAER - Empresa Brasileira de Aeronautica, S.A., Sao Jose dos Campos, Brazil) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 727-729. Previously cited in issue 11, p. 1607, Accession no. A90-29397. refs Copyright

A92-46815

OPTIMIZATION OF CONSTANT ALTITUDE-CONSTANT AIRSPEED FLIGHT OF TURBOJET AIRCRAFT

SHIVA K. OJHA (Indian Institute of Technology, Bombay, India) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 731-734. refs Copyright

Analytical expressions are derived for calculating the optimum cruising flight of a turbojet aircraft at the preliminary design stage. The altitude and airspeed are kept constant during the flight. First, the basic equation is written for the range, and the airspeed for the maximum range is then obtained. The optimum flight is illustrated by a realistic numerical example.

A92-46884

SENSITIVITY ANALYSIS OF DISCRETE PERIODIC SYSTEMS WITH APPLICATIONS TO HELICOPTER ROTOR DYNAMICS YI LU and V. R. MURTHY (Syracuse University, NY) AIAA Journal

(ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 1962-1969. refs Copyright

This paper presents a sensitivity formulation for periodic systems and a theoretical model for a helicopter rotor in forward flight. The formulation and the rotor model are validated by a few comparisons with other available methods and experimental values. The greatest advantage of the present sensitivity analysis is that the order of the Floquet matrix is independent of the number parameters to be investigated. This yields substantial savings in computation times over the existing methods. The formulation yields unique derivatives for the eigenvalues in spite of the nonuniqueness in the eigenvalues, and this includes also the frequency-locked region. The derivatives of the eigenvectors also follow from the same formulation except that it breaks down in the frequency-locked region. Author

A92-46919

A92-46960.

AHS INTERNATIONAL SPECIALISTS' MEETING ON ROTORCRAFT BASIC RESEARCH, GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, MAR. 25-27, 1991, PROCEEDINGS Meeting sponsored by AHS. Alexandria, VA, American Helicopter Society, 1991, 597 p. For individual items see A92-46920 to

The present conference on fundamental aspects of helicopter-related research discusses 1D beam dynamics, rotor dynamic hub load prediction, chaotic oscillation in rotor blade stall response, a nonlinear rigid body mass FEM for rotary wing dynamics, appropriate bases for nonlinear dynamic modal analysis, periodic trim solutions with hp-version finite elements in time, the unsteady interaction of a 3D vortex filament with a cylinder, and rotor wake development and wake/body interactions in hover. Also treated are the buckling of imperfect composite shells under compression and torsion, the nonlinear analysis of anisotropic rods, the buckling and crippling of thin-walled composite airframe structures under compression, the effect of damage on elastically tailored composite laminates, nonlinear anisotropic shell model analyses of rotor flex-structure, flow visualization of a small-diameter rotor operating at high rotational speeds, and a Eulerian/Lagrangian computing method for blade/vortex impingement. 0.0

A92-46921

PREDICTION OF DYNAMIC HUB LOAD OF A ROTOR **EXECUTING MULTIPLE SINUSOIDAL BLADE PITCH VARIATIONS**

GIZO HASEGAWA, TOMOARI NAGASHIMA, and TOSHIFUMI NEKOHASHI (National Defense Academy, Yokosuka, Japan) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 3-1 to 3-15. refs

Analytical and experimental studies were carried out for dynamic hub vertical load responses of a hingeless rotor in forward flight due to simultaneous implementation of multiple sinusoidal blade pitch variations. The unsteady air loads were evaluated by the hybrid wake model to stress a near shed wake effects. By applying the generalized harmonic balance method to a linear, model equation of motion of the blade, elastic blade motions and associated unsteady air load distributions were determined iteratively and time histories of hub vertical load responses were expressed by the Fourier series in terms of the reduced blade azimuth angle. Effects of control input parameters on the dynamic hub vertical load responses were numerically examined at various advance ratios and the optimum combinations of control input parameters which could minimize the dynamic hub vertical loads were ascertained. Author

A92-46922

CHAOTIC OSCILLATION IN HELICOPTER BLADE STALL RESPONSE

D. M. TANG and E. H. DOWELL (Duke University, Durham, NC) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings, Alexandria, VA, American Helicopter Society, 1991, p. 4-1 to 4-12. refs (Contract DAAL03-87-K-0023)

In this paper an ONERA aerodynamic stall model is applied to the analysis of helicopter blade stall response. The nonlinear state variable equations and the linear state variable perturbation equations are solved. A typical evolution process of the rotor blade stall response from periodic to aperiodic or chaotic motion and a necessary condition for onset of chaotic response are discussed. A comparison between the results from the ONERA stall model and a simpler nonlinear aerodynamic model is discussed. Author

A92-46924* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

A GENERAL PURPOSE NONLINEAR RIGID BODY MASS FINITE ELEMENT FOR APPLICATION TO ROTARY WING **DYNAMICS**

B. K. HAMILTON, F. K. STRAUB (McDonnell Douglas Helicopter Co., Mesa, AZ), and G. C. RUZICKA (U.S. Army, Aeroflightdynamics Directorate: NASA, Ames Research Center, Moffett Field, CA) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 8-1 to 8-15. refs (Contract NAS2-12343)

The Second Generation Comprehensive Helicopter Analysis System employs the present formulation of the general-purpose nonlinear rigid body mass finite element, which represents the hub masses, blade tip masses, and pendulum vibration absorbers. The rigid body mass element has six degrees of freedom, and accounts for gravitational as well as dynamic effects. A consequence of deriving the element's equations from various physical principles is that, prior to the transformation which couples the rigid body mass element to the rotor blade finite element, the forces obtained for each element are fundamentally different; this is true notwithstanding the degrees-of-freedom of each element are parameterized using the same coordinates.

A92-46925

RELATIVE ENERGY CONCEPTS IN HELICOPTER DYNAMICS

G. T. S. DONE (City University, London, England) International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 10-1 to 10-4. refs

For a model that can be represented by a mixed coordinate model, as in the case of the present helicopter ground-resonance model, energy contributions can be resolved and balanced despite the 'relative' form of some. This allows the model to be rationally described either as conservative, when expressed in the Coleman coordinate system, or nonconservative, when expressed in either fixed axes or a mixture of fixed and moving axes. The description is thus strictly relative to the frame of reference employed in the system definition. Similar understanding may be obtained on the basis of simpler dynamic models. O.C.

A92-46926

CHAOTIC DYNAMIC BEHAVIOR IN A SIMPLIFIED ROTOR **BLADE LAG MODEL**

GEORGE T. FLOWERS (Auburn University, AL) and BENSON H. TONGUE (California, University, Berkeley) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 11-1 to 11-9. refs

An investigation into the effects of pitch oscillation on the dynamical behavior of a simplified nonlinear rotor blade lag model is presented. The objective is to evaluate under what conditions a rotor blade might exhibit chaotic behavior. Such behavior is shown to exist and to exhibit a strong dependence on the specific parametric configuration of the system. Author

A92-46927

ON THE CHOICE OF APPROPRIATE BASES FOR NONLINEAR DYNAMIC MODAL ANALYSIS

O. A. BAUCHAU and D. GUERNSEY (Rensselaer Polytechnic Institute, Troy, NY) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 12-1 to 12-13. refs

(Contract DAAL03-88-C-0004)

This paper focuses on assessing the accuracy of various modal bases in nonlinear dynamic modal analysis of helicopter rotor blades by comparing their prediction with a reference solution obtained by integrating in time the full finite element equations. Perturbation modes are shown to provide an excellent basis for the modal analysis, as they accurately capture the nonlinear kinematic couplings. They provide a more accurate model than that based on natural vibration mode shapes.

A92-46930

BILINEAR FORMULATION APPLIED TO THE STABILITY AND RESPONSE OF HELICOPTER ROTOR BLADE

GRZEGORZ KAWIECKI (Tennessee, University, Knoxville) and NITHIAM T. SIVANERI (West Virginia University, Morgantown) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 17-1 to 17-13. refs

A time FEM based on Hamilton's law of varying action is applied to the analysis of helicopter blade dynamics. The bilinear formulation of Hamilton's law is used to discretize the temporal dependence of the equations of motion. Two approaches to the numerical implementation of the bilinear formulation are used. One of the approaches obtains the response of a general dynamical system using marching in time. The other approach is based on the assumption that the solution is identical at the beginning and at the end of one period. Thus, this approach is suitable for periodical systems. The bilinear formulation in marching mode is applied to test the response and the stability of rigid blade flapping. The bilinear formulation in imposed periodicity mode is used to investigate the response of a rigid blade with flap and lag DOFs in forward flight.

A92-46932* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AN AEROELASTIC ANALYSIS WITH A GENERALIZED DYNAMIC WAKE

CHENG J. HE and DAVID A. PETERS (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 19-1 to 19-15. Research sponsored by NASA. refs

An aeroelastic model with generalized dynamic wake is developed for application in the integration of aerodynamic, dynamic, and structural optimization of a rotor blade. The investigation is carried out with special attention to efficiency and accuracy of aeroelastic modeling. Each blade is assumed to be an elastic beam undergoing flap bending, lead-lag bending, elastic twist and axial deflections. The nonuniform blade is discretized into finite beam elements, each of which consists of twelve degrees of freedom. Such important blade design variables as pretwist, and chordwise offsets of the blade center of gravity and of the aerodynamic center from the elastic axis have been included in the analysis. Aerodynamic loads are computed from unsteady blade element theory where the rotor three-dimensional unsteady wake is modeled using a generalized dynamic wake theory. The noncirculatory loads based on unsteady thin airfoil theory are also included.

A92-46943

FREQUENCY DOMAIN FLIGHT TESTING AND ANALYSIS OF AN OH-58D HELICOPTER

JOHNNIE A. HAM and WILLIAM H. STORMER (U.S. Army, Aviation Technical Test Center, Fort Rucker, AL) IN: AHS International

Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 50-1 to 50-14. refs

A U.S. Army OH-58D helicopter has been used to demonstrate frequency-domain flight testing and analysis techniques in the course of 3 flight hours of hover and 60-knot forward flight operations. Bandwidth and phase-delay parameters were ascertained on the basis of the flight test data obtained according to the definitions of Aeronautical Design Standard ADS-33C, 'Handling Qualities Requirements of Military Rotorcraft'. A frequency-response identification program, FRESPID, was used to derive the parameters via discretized FFT algorithm on input control deflections and integrated output airframe angular rates. Excellent agreement was obtained between handling-qualities ratings and ADS-33-based handling quality level predictions.

A92-46945* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

ON THE ADEQUACY OF MODELING TURBULENCE AND RELATED EFFECTS ON HELICOPTER RESPONSE

V. V. GEORGE, G. H. GAONKAR (Florida Atlantic University, Boca Raton), J. V. R. PRASAD, and D. P. SCHRAGE (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 53-1 to 53-16. Research sponsored by NASA and Georgia Institute of Technology.

The present closed-form solution of a frequency-time spectrum for the dominant vertical turbulence velocity at an arbitrary blade station accounts for the instantaneous turbulence-energy transfer due to rotational velocity from the low-frequency to the high-frequency region, with the occurrence of several spectral peaks and split peaks. Comparisons of blade-flapping response to blade- and body-fixed turbulence is also presented, over a range of turbulence-scale length and advance ratios. Attention is given to the use of cyclostationary turbulence and blade-response frequency-time spectra to simultaneously predict temporal and frequency characteristics. Rotational velocity substantially affects response statistics in low-altitude, low advance-ratio flight. O.C.

A92-46960

A MACH-SCALED POWERED MODEL FOR ROTOR-FUSELAGE INTERACTIONAL AERODYNAMICS AND FLIGHT MECHANICS INVESTIGATIONS

SYED R. AHMED (DLR, Braunschweig, Federal Republic of Germany) and FRIEDRICH-WILHELM MEYER (Braunschweig, Technische Universitaet, Federal Republic of Germany) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 36-1 to 36-12. Research supported by BMFT. refs

The present 1.5-m diameter Mach-scaled powered model for helicopter model aerodynamic research employs a four-blade hingeless rotor that is driven by a 16-kW hydraulic motor. Preliminary tests have been conducted with this apparatus for the case of a BO 105 helicopter's model fuselage to assess the effects of rotor operation on time-averaged fuselage pressure distributions at different advance ratios.

A92-4712

FREE VIBRATION ANALYSIS OF BRANCHED BLADES BY THE INTEGRATING MATRIX METHOD

J. D. CULP and V. R. MURTHY (Syracuse University, NY) Journal of Sound and Vibration (ISSN 0022-460X), vol. 155, no. 2, June 8, 1992, p. 303-315. refs
Copyright

The integrating matrix method is applied to determine the free vibration characteristics of bearingless rotor blades containing multiple branches at the root. It is necessary to include the axial degree-of-freedom in this analysis to account for the differential axial displacements in the branches. The inclusion of the axial degree-of-freedom leads to a nonlinear problem to determine the tension coefficients in the branches. The integrating matrix method

is again applied to solve this nonlinear problem. The eigenvalue problem corresponding to branched bearingless blades forms a proper Sturm-Liouville problem and the associated orthogonality condition between the eigenfunctions is identified. The method is validated through comparisons with existing methods.

A92-47404

WING LEADING EDGE DESIGN WITH COMPOSITES TO MEET BIRD STRIKE REQUIREMENTS

L. K. JOHN (DeHavilland Aircraft of Canada, Ltd., Canada) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 3-18.

Copyright

Details of the design and testing of a wing leading edge for the DASH 8 aircraft, sufficiently rugged to withstand bird strikes and other incidental impacts, are discussed. The fiber-reinforced composite leading edge designed for bird-impact resistance is shown to be comparable in weight with a conventional metal design that does not meet the bird-impact requirements and significantly lighter than metal designs that would meet these requirements. In addition to meeting the design criteria, the DASH 8 leading edge made with aramid fiber and honeycomb core provides cost and weight benefits together with aerodynamic cleanliness, resulting in greater fuel efficiency.

A92-47406

DESIGN AND TEST OF AIRCRAFT AFT FUSELAGE STRUCTURE USING POSTBUCKLED SHEAR PANELS

JOHN H. PIMM (Vought Corp., Dallas, TX) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 33-48.

Copyright

The possible use of composites for the manufacture of the aft fuselage structure is investigated. Design concepts for composite aft fuselage components are considered, and test results are presented for several alternatives. Criteria for the choice of a material (e.g., graphite versus aramid fiber) in several different components are discussed. It is estimated that the use of composites instead of metal in the aft fuselage structure can provide a saving of 31.4 percent in nonrecurring costs and an overall saving of 15 percent.

A92-47408

DESIGN OF HELICOPTER COMPOSITE STRUCTURES FOR CRASHWORTHINESS

JAMES D. CRONKHITE (Bell Helicopter Textron, Inc., Fort Worth, TX) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 79-92. refs (Contract DAAK51-79-C-0037)

Copyright

Results of tests for the compliance with the MIL-STD-1290 crashworthiness requirements are reported for an all-composite helicopter. In particular, attention is given to concepts behind successful crashworthiness design; the use of compressive failure tests for graphite, aramid fiber, and fiberglass cylinders to assist in material selection; energy-absorbing floor beam design concepts; and design, manufacture, and testing of cabin test sections. It is demonstrated that MIL-STD-1290 crashworthiness requirements can be met with a composite fuselage structure if designed with energy absorption and load attenuation in controlled areas. Specially designed energy-absorbing aramid/epoxy sandwich structures are found to be particularly crashworthy.

A92-47591

AIRBUS A319 - COMPLETION OF THE STANDARD FUSELAGE FAMILY (AIRBUS A319 - ERGAENZUNG DER STANDARDRUMPF-FAMILIE)

Luft- und Raumfahrt (ISSN 0173-6264), vol. 13, no. 3, May-June 1992, p. 12-14. In German. Copyright

The completion of the Airbus A319, a shortened version of the A320, is discussed. Market considerations supporting the production of an aircraft of this size are reviewed. The role of government regulations in the decision to develop the aircraft is addressed.

C.D.

A92-47629

THE EFFECT OF COMPOSITE MATERIAL ALLOWABLE CHANGES ON VTOL AIRFRAME WEIGHTS

R. L. FOYE (Sterling Software, Inc., Dallas, TX) and R. J. PEYRAN (U.S. Army, Washington, DC) Weight Engineering (ISSN 0583-9270), vol. 51, no. 3, Spring 1992, p. 39-51. refs Copyright

A method for estimating changes in structural weight required to compensate for small changes in the principal mechanical weight allowables of the materials of construction is described. The method is statistically based on the distribution and usage of structurally active composite materials in the Boeing V-22 tilt rotor, Boeing 360 tandem rotor, and single rotor ACAP airframes. For each structural weight category, the percentage of composite that is critical in each material allowable category is estimated. Relations are proposed that link these material volumes to the requirement levels and allowable values. This permits the calculation of component weight changes necessary to compensate for fractional allowable changes while maintaining full structural capacity and margins of safety. Issues such as cost changes corresponding to allowable changes and vehicle size effects have also been included. Two example problems are given.

A92-47657

PROBABILITY ANALYSIS OF STRUCTURE FAILURE FOR THE WINGS WITH MAIN AND SUBORDINATE COMPONENTS

WEI ZHANG (Shaanxi Aircraft Co., Dept. of Development, Chengdu, People's Republic of China) and FU-JIA LIN (Northwestern Polytechnical University, Xian, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A133-A138. In Chinese. refs

A reliability analysis methodology based on the probability fracture mechanics was developed for a wing with main and subordinate components, with account taken for such factors as the crack detection probability, the inspection interval, the inital flaw distribution, the crack growth, and residual strength. The method uses the crack size-time relationship $a(t) = a(0) \exp\left(at\right)$, in which the equivalent initial flaw size a(0) is a lognormal random variable. The correlation between the main and the subordinate components in fatigue properties is considered, and equations are derived for computing the failure rate and the failure probability of structures in any service interval. Results of a calculation example for the wings of a fighter show that the fatigue life of subordinate components has significant effect on the probability of failure of the main component.

A92-47664

DURABILITY ANALYSIS FOR A MAIN BULKHEAD SUBJECTED TO LOAD ON THE BODY OF AN AIRCRAFT

WEN-TING LIU (Beijing University of Aeronautics and Astronautics, People's Republic of China), JUN JIANG, GUI-WEN LI, LI-ZHONG SHEN, GUO-RONG JIA, and RONG-MING SHI Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A187-A192. In Chinese. refs

Results are presented of a durability analysis for the main aircraft bulkhead, with fastener holes on the cross beams, subjected to a load on the body of an aircraft. The degree of damage and the economic life of the main bulkhead were evaluated for a fleet of airframes. Results were used to design a rational repair program.

A92-47666

SONIC FATIGUE ANALYSIS AND ANTI-SONIC FATIGUE DESIGN OF AIRCRAFT STRUCTURE

XIU-YI ZHANG Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A197-A201. In Chinese. refs

Sonic fatigue was calculated for several types of typical structural elements of an aircraft, using a quick analysis method

which made it possible to accommodate various noise spectrum shapes. The structural response frequency expressions for different structural configurations were derived, which define the response of the acoustic specimen and the sonic fatigue damage accumulation rate. The design of an antiacoustic-fatigue aircraft structure is considered.

A92-47667

A FAILURE ANALYSIS FOR LANDING GEAR STRUCTURAL SYSTEM

ZHONG XU (Nanjing Aeronautical Institute, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A202-A205. In Chinese. refs

A failure analysis method based on the reliability theory is developed and used to analyze an aircraft landing gear system. Using published data on a large number of landing gear investigations, failure distribution curves were determined and the reliability during economic life was calculated. It is shown that the new method is simple, effective, and economic.

A92-47759 THE AIRPLANE

Lockheed Horizons (ISSN 0459-6773), no. 30, May 1992, p. 28-43.

Copyright

An overview is presented of the F-117 Stealth Fighter, the first operational aircraft to exploit low observable stealth technology. The single-seat fighter is designed to penetrate dense threat environments at night and to attack high-value targets with pinpoint accuracy. Attention is given to the twin turbofan engines, the FBW flight controls, and the cockpit layout that includes a large video monitor to display IR imagery from onboard sensors.

A92-47969

A340 HANDLING, COCKPIT DESIGN IMPROVE ON PREDECESSOR A320

DAVID M. NORTH Aviation Week and Space Technology (ISSN 0005-2175), vol. 137, no. 2, July 13, 1992, p. 38-41, 44, 45. Copyright

A92-47975

US NAVY REVISITS ESCAPE MODULES

JOHN KELLER Interavia Aerospace Review (ISSN 0020-6512), vol. 47, July 1992, p. 28-30.

Copyright

U.S. Navy scientists are researching a technology that has been considered in the past, to develop several high-speed and high-altitude aircraft escape modules, in which the pilot remains strapped in and the jettisoned self-contained module parachutes to the ground. One option under consideration would transform the cockpit after separation into a tiny aircraft, thus allowing combat pilots to fly to safe areas for rapid and easy rescue. The work in this research area of the Naval Air Warfare Center, and several civilian aircraft manufacturers is reviewed.

A92-48022

AEROSPACE PRESSURIZATION SYSTEM DESIGN

SAE Aerospace Information Report SAE AIR 1168/7, March 15, 1991, 19 p. refs

(SAE AIR 1168/7) Copyright

The pressurization system design considerations are presented in this Aerospace Information Report. Problems discussed include human physiological requirements, characteristics of pressurization air sources, methods of controlling cabin pressure, cabin leakage control, leakage calculation methods, and methods of emergency cabin pressure release.

O.G.

A92-48352

CHARACTERIZATION OF THERMAL PERFORMANCE OF WHEEL OUTBOARD OF AN AIRCRAFT

K. VAFAI and C. DESAI (Ohio State University, Columbus) International Communications in Heat and Mass Transfer (ISSN 0735-1933), vol. 19, no. 4, July-Aug. 1992, p. 541-547. Research

supported by BF Goodrich zco. and Ohio Supercomputer Center. refs

Copyright

The wheel outboard portion of an aircraft brake housing which is modeled as an annular cavity with one end open to the ambient surroundings is investigated in this work. To simulate actual conditions, a set of boundary conditions obtained from brake system tests were fed into the numerical model. Based on proper non-dimensionalization, and using a finite element numerical model a set of psuedo-universal dimensionless temperatures for different Rayleigh numbers associated with each of the temperature conditions corresponding to the actual test data were obtained. Pertinent temporal and steady state thermal performance characteristics of the wheel outboard portion of the brake housing are also examined.

A92-48408

BISTATIC SCATTERING ON A MONOSTATIC RADAR RANGE

WOLFGANG F. HERDEG (DLR, Institut fuer Hochfrequenztechnik, Oberpfaffenhofen, Federal Republic of Germany) and HORST WENDEL (Telefunken Systemtechnik GmbH, Ulm, Federal Republic of Germany) European Transactions on Telecommunications and Related Technologies (ISSN 1120-3862), vol. 2, no. 4, July-Aug. 1991, p. 459-461. refs Copyright

Suitable combination of monostatic radar range and reflector plate allows to study bistatic scattering while varying only the aspect angle. The scheme is exemplified by measuring the scattering from an isolated rectangular metal edge. The various scattering contributions are discriminated by high resolution imaging.

Author

A92-48586

THE A320 LAMINAR FIN PROGRAMME

J. J. THIBERT (ONERA, Chatillon, France), A. QUAST (DLR, Braunschweig, Federal Republic of Germany), and J. P. ROBERT (Airbus Industrie, Toulouse, France) (European Forum on Laminar Flow Technology, 1st, Hamburg, Federal Republic of Germany, Mar. 16-18, 1992) ONERA, TP no. 1992-23, 1992, 8 p. (ONERA, TP NO. 1992-23)

A review is presented of ongoing research into hybrid laminar flow as a drag reduction technique for the next generation of transport aircraft. The wind tunnel model, its equipment and the suction device are described. Results concerning the aerdynamic aspects and current progress of the program are presented.

R.E.P.

A92-48589

RESEARCH ON HELICOPTER ROTORS - PROGRESS IN AERODYNAMICS, AEROELASTICITY AND ACOUSTICS [RECHERCHES SUR LES ROTORS D'HELICOPTERES - PROGRES EN AERODYNAMIQUE, AEROELASTICITE ET ACOUSTIQUE DES ROTORS D'HELICOPTERES]

JEAN-JACQUES PHILIPPE (ONERA, Chatillon, France) (L'Aeronautique et l'Astronautique, no. 152, 1992, p. 13-17) ONERA, TP no. 1992-27, 1992, 6 p. In French. refs (ONERA, TP NO. 1992-27) Copyright

Several research and development improvements on helicopter rotors accomplished over the past 20 years at ONERA are reviewed. Continuing studies focusing on new rotor concepts to assure a better compromise between aerodynamic performance, vibration levels, and rotor noise are described. Attention is given to the aerodynamics of rotors, the aeroelasticity of rotor blades, and the various areas of external noise generation.

A92-48739#

INVESTIGATIONS OF PROPULSION INTEGRATION INTERFERENCE EFFECTS ON A TRANSPORT AIRCRAFT CONFIGURATION

C.-C. ROSSOW (DLR, Institut fuer Entwurfsaerodynamik, Braunschweig, Federal Republic of Germany), J.-L. GODARD (ONERA, Direction de l'Aerodynamique, Chatillon, France), H. HOHEISEL (DLR, Institut fuer Entwurfsaerodynamik, Braunschweig,

Federal Republic of Germany), and V. SCHMITT (ONERA, Direction de l'Aerodynamique, Chatillon, France) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 17 p. refs (AIAA PAPER 92-3097) Copyright

In a joint effort ONERA and DLR have assessed the interference effects of a genetic twin-engine transport aircraft configuration equipped with throughflow nacelles. Both experimental and theoretical investigations were performed. The results showed that the installation of the nacelles had substantial effects on total forces at cruise Mach number. With respect to the clean configuration, total lift decreased at constant incidence, and total drag increased at constant lift. A detailed analysis of the flowfield revealed that for transonic flows the installation of the nacelle influenced the complete upper wing surface. On the lower wing surface the flow was considerably accelerated due to the propulsion system, and a supersonic region terminated by a shock wave appeared. The nacelle pressure distribution was also substantially influenced by interference effects. Comparison of experimental and numerical results showed that the solution of the Euler equations is well capable of simulating the interference effects.

A92-48915# FIGHTER AIRFRAME/PROPULSION INTEGRATION - A GENERAL DYNAMICS PERSPECTIVE

J. V. KITOWSKI (General Dynamics Corp., Fort Worth, TX) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 14 p. refs (AIAA PAPER 92-3332) Copyright

General Dynamics Fort Worth Division, along with the General Electric Co., recently completed the initial phase of the Fighter Airframe Propulsion Integration Pre-Design investigation. The study, conducted for the USAF Wright Laboratory addresses the application of Multi-Axis Thrust Vectoring (MATV) technology to derivative configurations of the F-16 aircaraft. This paper summarizes the findings in two key areas: configuration trade studies with associated integration issues and combat effectiveness assessment with benefit-to-cost trends. The configuration trades section considers MATV installation options, perfromance and maneuver improvements, air-frame design impacts, flying qualities, and propulsion/flight controls integration. The combat effectiveness investigation compares mission capabilities of the baseline configuration versus MATV options for selected air-to-air and air-to-ground missions.

A92-48916#

FIGHTER AIRFRAME/PROPULSION INTEGRATION - A MCDONNELL AIRCRAFT PERSPECTIVE

JAMES MACE and GREGORY NYBERG (McDonnell Aircraft Co., Saint Louis, MO) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs

(AIAA PAPER 92-3333) Copyright

active McDonnell Aircraft is in integrated aerodyresearch namic/propulsion controls having flown three demonstrator aircraft (SMTD, HARV, HIDEC/PSC) with thrust vectoring and/or integrated flight/propulsion control devices into new conceptual multimission fighter aircraft has also been examined. It was found that the use of advanced aerodynamic control techniques, multiplane thrust vectoring and flight/propulsion control technologies allowed new strike aircraft concepts to evolve. These concepts have expanded mission capabilities and lower takeoff gross weights when compared to a fighter without the advanced devices. Author

A92-48917#

EMERGING AIRFRAME/PROPULSION INTEGRATION TECHNOLOGIES AT GENERAL ELECTRIC

R. MISHLER and T. WILKINSON (GE Aircraft Engines, Cincinnati, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3335) Copyright

The present survey of a major airframe manufacturer's efforts

toward military powerplant/airframe integration highlights the design features and performance capabilities of the Axisymmetric Vectoring Exhaust Nozzle (AVEN) for the F-110 engine. In the AVEN, the compression links of the F-110 engine's conventional nozzle is replaced by an external loadcarrying flap/frame system that is connected to a pitch-and-yaw-axis-vectoring ring. All turning of the exhaust flow is accomplished by the divergent section of the nozzle, aft of the (normally choked) nozzle throat; if the rin is translated fore-and-aft rather than tilted, the effect is an opening and closing of the exhaust exit area.

A92-48941#

AN EIGHT MONTH GEARBOX DEVELOPMENT PROGRAM

GREGORY PEREZ, JR. and ROBERT B. BOSSLER, JR. (Lucas Western, Inc., City of Industry, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 6 p.

(AIAA PAPER 92-3368) Copyright

An engine-mounted accessory-drive gearbox for a new gas turbine engine for commercial aircraft was developed from layout to delivery of the first unit in eight months, rather than the 15 to 18 months normally required. The gearbox drives seven accessories, weighs 50 pounds and has an input of 121 horsepower at 19,837 RPM. The design includes a zerol-type spiral-bevel set and eight spur gears, all carburized and ground. The program required detailed project management, innovative concurrent engineering, manufacturing coordination and careful attention to component lead times.

N92-28435*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTEGRATING AERODYNAMICS AND STRUCTURES IN THE MINIMUM WEIGHT DESIGN OF A SUPERSONIC TRANSPORT WING

JEAN-FRANCOIS M. BARTHELEMY (Lockheed Engineering and Sciences Co., Hampton, VA.), GREGORY A. WRENN (Lockheed Engineering and Sciences Co., Hampton, VA.), AUGUSTINE R. DOVI (Lockheed Engineering and Sciences Co., Hampton, VA.), PETER G. COEN, and LAURA E. HALL (Unisys Corp., Hampton, VA.) Apr. 1992 15 p Presented at the AIAA/ASCE/ASME/AHS/ASC 33rd Structures, Structural Dynamics and Materials Conference, Dallas, TX, 13-15 Apr. 1992

(Contract RTOP 505-63-50-06)

(NASA-TM-107586; NAS 1.15:107586) Avail: CASI HC A03/MF A01

An approach is presented for determining the minimum weight design of aircraft wing models which takes into consideration aerodynamics-structure coupling when calculating both zeroth order information needed for analysis and first order information needed for optimization. When performing sensitivity analysis, coupling is accounted for by using a generalized sensitivity formulation. The results presented show that the aeroelastic effects are calculated properly and noticeably reduce constraint approximation errors. However, for the particular example selected, the error introduced by ignoring aeroelastic effects are not sufficient to significantly affect the convergence of the optimization process. Trade studies are reported that consider different structural materials, internal spar layouts, and panel buckling lengths. For the formulation, model and materials used in this study, an advanced aluminum material produced the lightest design while satisfying the problem constraints. Also, shorter panel buckling lengths resulted in lower weights by permitting smaller panel thicknesses and generally, by unloading the wing skins and loading the spar caps. Finally, straight spars required slightly lower wing weights than angled spars.

Author

N92-28468# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Flight Mechanics

AIRCRAFT SHIP OPERATIONS [LE COUPLE AERONEF-NAVIRE DANS LES OPERATIONS]

J. G. HOEG (Naval Air Test Center, Patuxent River, MD.) Apr. 1992 13 p Presented at the Flight Mechanics Panel Symposium, Seville, Spain, 20-23 May 1991

(AGARD-AR-312; ISBN-92-835-0668-5) Copyright Avail: CASI HC A03/MF A01

Worldwide interest in the use of shipborne aircraft as a major weapons system is very broad. Many NATO countries operate fixed wing aircraft from ships. Additionally, the use of ships as helicopter platforms is extensive in the NATO community and brings another important dimension to the aircraft/ship interface issue. Thus, it seemed that both fixed and rotary wing aviation deserved equal billing in the Aircraft/Ship Interface Symposium which is the subject of this Technical Evaluation Report. The Symposium contained twenty-five presentations grouped under the following topics: Keynote Addresses; Ship Environment; Guidance, Controls, and Displays; Flight Test and Simulation Techniques; Launch, Recovery, and Handling Systems Development; and Operational Views and Future Developments.

N92-28469# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.

INTEGRATED DESIGN ANALYSIS AND OPTIMISATION OF AIRCRAFT STRUCTURES [L'ANALYSE INTEGRALE DE LA CONCEPTION ET L'OPTIMISATION DES STRUCTURES DES AERONEFS]

May 1992 88 p Lectures held in Pasadena, CA, 8-9 Jun. 1992, in Lisbon, Portugal, 22-23 Jun. 1992, and in London, England, 25-26 Jun. 1992

(AGARD-LS-186; ISBN-92-835-0675-8) Copyright Avail: CASI HC A05/MF A01

There is a lack of precise information on the effectiveness of specific methods in generating optimum designs for realistic aircraft structures. In this situation it is difficult for designers to make decisions on which systems to employ for a given design problem and which developments to pursue. Thus it is necessary for designers to be aware of the relative merits of the different methods currently used for the design optimization of advanced aircraft. This lecture series covers the methods available for the computer based design analysis and design optimization of aircraft structures. The lecture series deals with the principles and practices adopted to integrate the various factors which are considered in the design of advanced aircraft. These factors include: structural shape, aerodynamics, active control technology and aircraft performance.

N92-28470# Cranfield Inst. of Tech., Bedford (England). Dept. of Aerospace Science.

FUNDAMENTALS OF STRUCTURAL OPTIMISATION

A. J. MORRIS In AGARD, Integrated Design Analysis and Optimisation of Aircraft Structures 13 p May 1992 Copyright Avail: CASI HC A03/MF A01

Structural optimization is concerned with the computerized automatic design of structures which are optimum with respect to some major design parameter. In the aircraft industry this parameter has usually been structural weight, though cost, performance, or other factors are now being considered. The general problem which is characterized here remains unchanged so that the basic nature of the optimization problem is the same for all applications. Also the structural optimization problem is always characterized by the finite element method (FEM). The use and application of these methods to computer aided design (CAD) requires some understanding of the underlying mathematical principles. It is shown that this process of developing solution methods use the optimization criteria as the basis for creating the up-date formulae which are the solution algorithm drivers.

N92-28471# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Military Aircraft Div.

PRACTICAL ARCHITECTURE OF DESIGN OPTIMISATION SOFTWARE FOR AIRCRAFT STRUCTURES TAKING THE MBB-LAGRANGE CODE AS AN EXAMPLE

J. KRAMMER In AGARD, Integrated Design Analysis and Optimisation of Aircraft Structures 16 p May 1992
Copyright Avail: CASI HC A03/MF A01

The structural optimisation system MBB-Lagrange allows the

optimization of homogeneous isotropic, orthotropic or anisotropic structures as well as fiber reinforced materials. With the simultaneous consideration of different requirements in the design of aircraft structures it is possible to reduce the number of iteration steps between design, analysis and manufacturing. Based on finite element methods for structures and panel methods for aerodynamics, the analysis with sensitivity includes modules for static, buckling, dynamic, static aeroelastic and flutter calculations. The optimization algorithms consists of mathematical programming methods and an optimization and analysis/sensitivity is the optimization model which leads to a very modular architecture. Typical application examples show the power and generality of the approach.

N92-28472# Dassault (E. M.) Co., Saint Cloud (France). STRUCTURAL OPTIMIZATION OF AIRCRAFT

C. CORNUAULT and C. PETIAU *In* AGARD, Integrated Design Analysis and Optimisation of Aircraft Structures 17 p May 1992 Copyright Avail: CASI HC A03/MF A01

A general survey of Dassault experience and knowledge on Aircraft Design with Optimization Methods is depicted. This survey results from compiling the developments and the results already worked out and already presented in several papers. Part 1 gives a detailed description of the methodology. The special features of optimization with composite materials are shown. The organization of design resulting from use of optimization techniques is described and techniques neighboring optimization as model adjustment are reviewed, as well as further developments. Part 2 illustrates this methodology by an actual case study of an aircraft design by Dassault-Aviation with relevant examples of structural and aeroelastic optimization on carbon structures of a wing and a fin.

N92-28473*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MULTIDISCIPLINARY DESIGN AND OPTIMIZATION

JAROSLAW SOBIESZCZANSKI-SOBIESKI In AGARD, Integrated Design Analysis and Optimisation of Aircraft Structures 15 p May 1992 Presented as A System Approach to Aircraft Optimization, Paper No. 2 at the AGARD Workshop on Integrated Design Analysis and Optimization of Aircraft Structures, Bath, England, 1-2 May 1991

(AGARD-PAPER-2) Copyright Avail: CASI HC A03/MF A01

Mutual couplings among the mathematical models of physical phenomena and parts of a system such as an aircraft complicate the design process because each contemplated design change may have a far reaching consequence throughout the system. This paper outlines techniques for computing these influences as system design derivatives useful to both judgmental and formal optimization purposes. The techniques facilitate decomposition of the design process into smaller, more manageable tasks and they form a methodology that can easily fit into existing engineering optimizations and incorporate their design tools.

Author

N92-28474# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Military Aircraft Div.

MATHEMATICAL OPTIMIZATION: A POWERFUL TOOL FOR AIRCRAFT DESIGN

OTTO SENSBURG /n AGARD, Integrated Design Analysis and Optimisation of Aircraft Structures 19 p May 1992 Copyright Avail: CASI HC A03/MF A01

Formal mathematical optimization methods have been developed during the past 10 to 15 years for the structural design of aircraft. Together with reliable analysis programs like finite element methods they provide powerful tools for the structural design. They are efficient in at least two ways: (1) producing designs that meet all specified requirements at minimum weight in one step; and (2) relieving the engineer from a time consuming search for modifications that give better results, they allow more creative design modifications. MBB has developed a powerful optimization code called MBB-Lagrange which uses mathematical programming and gradients to fulfill different constraints simultaneously. Some examples depicting the successful application of the

MBB-LAGRANGE code are presented. Also results of other optimization codes are shown. The paper closes with an outlook on how the optimization problem could be enlarged to include the shape and size of airplanes.

Author

N92-28531# Royal Aerospace Establishment, Bedford (England). FMS Div.

VALIDATION OF SIMULATION SYSTEMS FOR AIRCRAFT ACCEPTANCE TESTING

A. A. WOODFIELD *In* AGARD, Piloted Simulation Effectiveness 4 p Feb. 1992

Copyright Avail: CASI HC A01/MF A03

There is currently a limited role for simulation in flight clearance of sub-systems in civil aircraft. However, the extensive use of simulation for manned space vehicle clearance shows the potential for simulation to join other rigs in flight clearance. There is a serious risk that simulation could prove inadequate if there is no systematic validation program. Simulation is a complex integration of models of vehicles and the environment, physical sensation devices and the pilot. Any of these can be modified to compensate for inadequacies in parts of the simulation. This can be acceptable for training simulators but is not acceptable for clearance activities because the influence of such modifications cannot be predicted in situations that are not going to be tested in flight. These issues are discussed.

N92-28649# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

THE USE OF LOAD ENHANCEMENT FACTORS IN THE CERTIFICATION OF COMPOSITE AIRCRAFT STRUCTURES J. LAMERIS 22 Feb. 1990 60 p

(Contract OV/RLD-987)

(NLR-TP-90068-U; ETN-92-91432) Avail: CASI HC A04/MF A01

In the full scale durability and damage tolerance tests of composite aircraft structures, the U.S. and European certification requirements demand among other things that the number of cycles applied are statistically significant and that the influence of the environment has been taken into account. Several certification methods which take into account the requirement of having sufficient statistically reliable data are described. A review of the way in which these requirements are interpreted and applied in four composite aircraft certification programs in particular with regard to the application of so called enhancement factors is given.

N92-28687# National Aerospace Lab., Amsterdam (Netherlands). Aerodynamics Div.

LAH-MAIN ROTOR MODEL TEST AT THE DNW

J. W. G. VANNUNEN (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.).), C. HERMANS (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.).), and H.-J. LANGER (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick, Germany, F.R.) 10 Aug. 1990 14 p Presented at the 16th European Rotorcraft Forum, Glasgow, Scotland, 18-21 Sep. 1990 Previously announced in IAA as A92-35771

A92-35771 (NLR-TP-90305-U; ETN-92-91446) Avail: CASI HC A03/MF A01

In the context of a feasibility and cost definition study for the A129 LAH, a wind tunnel experiment was executed in the wind tunnel on a dynamically and Mach scaled mode of the main rotor. The tests aimed at getting more reliable answers to the question of which of the proposed rotor configurations would fulfil the stringent flight performance requirements of the new helicopter best. The rotor diameter amounted to 3.5 m. Four different rotor configurations were examined, the variations being either in the blade tip shape or in the twist distribution along the span of the The dynamic characteristics of the various blade configurations were found to agree reasonably well. An exception in this respect should only be made for those blade configurations that have swept back tips. These specific blades exhibit definitely lower torsional frequencies than comparable blades with straight tips. The rotor torque measured on the model rotor correlates well up to 130 kts with the torque as determined during flight tests. Comparing the different rotor configurations considered during the present test, the high twist blade set is found to produce the highest vibration levels at the higher advance ratios.

N92-28714# National Aerospace Lab., Amsterdam (Netherlands). Dept. of Flight Testing and Helicopters.

S-76B CERTIFICATION FOR VERTICAL TAKE-OFF AND LANDING OPERATIONS FROM CONFINED AREAS

J. M. G. F. STEVENS and H. J. G. C. VODEGEL 16 Aug. 1990 20 p Presented at 16th European Rotorcraft Forum, Glasgow, Scotland, 18-21 Sep. 1990 Previously announced in IAA as A92-35760

(NLR-TP-90286-U; ETN-92-91544) Avail: CASI HC A03/MF A01 Data necessary for certification of vertical operations for the Sikorsky S-76B were generated. A computer simulation program was used to calculate two dimensional flight trajectories after an engine failure during takeoff or landing. Based on the initial results of computer simulations, flight tests were carried out during which single engine failure was simulated. Test data were recorded by video on board and on the ground. Calculated and flight test data were in good agreement over the considered range of masses, maneuvers and atmospheric conditions. Procedures for Category A vertical operations with the S-76B were determined with the use of the computer program.

N92-28720*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.

IDENTIFICATION OF AERODYNAMIC MODELS FOR MANEUVERING AIRCRAFT Final Report

C. EDWARD LAN and C. C. HU 30 Jun. 1992 101 p. (Contract NAG1-1087)

(NASA-CR-190444; NAS 1.26:190444; KU-FRL-872-5) Avail: CASI HC A06/MF A02

The method based on Fourier functional analysis and indicial formulation for aerodynamic modeling as proposed by Chin and Lan is extensively examined and improved for the purpose of general applications to realistic airplane configurations. Improvement is made to automate the calculation of model coefficients, and to evaluate more accurately the indicial integral. Test data of large angle-of-attack ranges for two different models, a 70 deg. delta wing and an F-18 model, are used to further verify the applicability of Fourier functional analysis and validate the indicial formulation. The results show that the general expression for harmonic motions throughout a range of k is capable of accurately modeling the nonlinear responses with large phase lag except in the region where an inconsistent hysteresis behavior from one frequency to the other occurs. The results by the indicial formulation indicate that more accurate results can be obtained when the motion starts from a low angle of attack where hysteresis effect is not important. Author

N92-28721*# National Aeronautics and Space Administration.

Ames Research Center, Moffett Field, CA.

THERMAL RESPONSE OF RIGID AND FLEXIBLE INSULATIONS AND REFLECTIVE COATING IN AN AEROCONVECTIVE HEATING ENVIRONMENT

D. A. KOURTIDES, S. A. CHIU, D. J. IVERSON, and D. M. LOWE Mar. 1992 81 p

(Contract RTOP 506-43-31)

(NASA-TM-103925; A-92064; NAS 1.15:103925) Avail: CASI HC A05/MF A01

Described here is the thermal performance of rigid and flexible thermal protection systems considered for potential use in future Aeroassist Space Transfer Vehicles. The thermal response of these materials subjected to aeroconvective heating from a plasma arc is described. Properties that were measured included the thermal conductivity of both rigid and flexible insulations at various temperatures and pressures and the emissivity of the fabrics used in the flexible insulations. The results from computerized thermal analysis models describing the thermal response of these materials subjected to flight conditions are included.

N92-28771# Aeronautical Research Labs., Melbourne (Australia).

REDUCTION AND ANALYSIS OF F-111C FLIGHT DATA

P. PIPERIAS Dec. 1991 51 p

(AD-A250341; ARL-STRUC-TM-544; DODA-AR-006-633) Avail: CASI HC A04/MF A01

As part of a program to determine inspection intervals for the stiffener runout regions of the upper plates of the wing pivot fittings of RAAF F-111 aircraft, the possible influence on crack growth of stores carried and of low and negative g-spectrum loading hoten examined for reconnaissance aircraft, the remaining F-111 fleet, and for aircraft A8-148. Derived gust loading spectra for the same F-111 groups have also been determined.

N92-28802# Naval Postgraduate School, Monterey, CA.
TASKING AND COMMUNICATION FLOWS IN THE F/A-18D
COCKPIT: ISSUES, PROBLEMS, AND POSSIBLE SOLUTIONS
M.S. Thesis

MARK F. MCKEON Sep. 1991 77 p (AD-A245977) Avail: CASI HC A05/MF A01

The U.S. Marine Corps is replacing its A-6E TRAM aircraft with the two seat F/A-18D. With the exception of the F-15E Strike Eagle, never has a tactical aircraft been capable of processing such a vast amount of multi-mission data and displaying that fighter/attack information to the aircrew. These vast capabilities have led to some problems in the area of F/A-18D aircrew coordination. This thesis will review communication flows and tasking procedures that exist in many Group Decision Support Systems (GDSS) to develop guidelines that are applicable to tactical aircraft aircrew coordination procedures. These guidelines will then be applied to combat mission essential F/A-18D cockpit communication and tasking procedures that should be executed during various scenarios. Additionally, simulator flight profiles will be postulated to test, evaluate and verify these procedures. This study provides a framework on combat procedures that will not only benefit the Marine Corps' F/A-18D community, but as they start bringing into their inventory the two sea F/A-18E/F, the U.S. Navy as well. Author (GRA)

N92-28901# National Aerospace Lab., Tokyo (Japan). Flight Test Team.

AERODYNAMIC CHARACTERISTICS OBTAINED FROM ALPHA SWEEP TEST OF THE QUIET STOL EXPERIMENTAL AIRCRAFT ASKA

TOSHIO BANDOU May 1991 67 p In JAPANESE (ISSN 0389-4010)

(NAL-TR-1112; JTN-92-80381) Avail: CASI HC A04/MF A01

Longitudinal aerodynamic characteristics are one of the most important considerations in aircraft design. Using the NAL Short Take Off and Landing (STOL) experimental aircraft, ASKA, an alpha sweep method was adopted instead of using the conventional discrete method to investigate ASKA's longitudinal aerodynamic characteristics. ASKA's longitudinal aerodynamic characteristics are described based on analysis of the test results. In addition, longitudinal aerodynamic coefficients obtained from flight tests are compared with the ASKA's wind tunnel design configuration. ASKA showed a pitch up phenomena during shallow Upper Surface Blowing (USB) flap angles, and also encountered path divergence in the flaps up configuration, being a significant phenomena for a powered lift aircraft. Powered lift aircraft's lift coefficient consists of basic lift due to wing and flaps, direct jet thrust, and supercirculation. This lift build-up is described using calculation results of flight test data. The powered lift factor, a key parameter for powered lift aircraft, is also described. Author (NASDA)

N92-28910*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

BINARY OPTICAL FILTERS FOR SCALE INVARIANT PATTERN RECOGNITION

MAX B. REID, JOHN D. DOWNIE, and BUTLER P. HINE Apr. 1992 12 p (Contract RTOP 506-51-31)

(NASA-TM-103902; A-92014; NAS 1.15:103902) Avail: CASI HC A03/MF A01

Binary synthetic discriminant function (BSDF) optical filters which are invariant to scale changes in the target object of more than 50 percent are demonstrated in simulation and experiment. Efficient databases of scale invariant BSDF filters can be designed which discriminate between two very similar objects at any view scaled over a factor of 2 or more. The BSDF technique has considerable advantages over other methods for achieving scale invariant object recognition, as it also allows determination of the object's scale. In addition to scale, the technique can be used to design recognition systems invariant to other geometric distortions.

N92-28926*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

ROTORCRAFT IN-FLIGHT SIMULATION RESEARCH AT NASA AMES RESEARCH CENTER: A REVIEW OF THE 1980'S AND PLANS FOR THE 1990'S

EDWIN W. AIKEN, WILLIAM S. HINDSON, J. VICTOR LEBACQZ, DALLAS G. DENERY, and MICHELLE M. ESHOW (Army Aviation Systems Command, Moffett Field, CA.) Aug. 1991 15 p Presented at the International Symposium on In-Flight Simulation for the 1990's, Braunschweig, Germany, 1-3 Jul. 1991 Sponsored in part by Army Aviation Systems Command, St. Louis, MO (Contract RTOP 505-59-36)

(NASA-TM-103873; A-91178; NAS 1.15:103873) Avail: CASI HC A03/MF A01

A new flight research vehicle, the Rotorcraft-Aircrew System Concepts Airborne Laboratory (RASCAL), is being developed by the U.S. Army and NASA at ARC. The requirements for this new facility stem from a perception of rotorcraft system technology requirements for the next decade together with operational experience with the Boeing Vertol CH-47B research helicopter that was operated as an in-flight simulator at ARC during the past 10 years. Accordingly, both the principal design features of the CH-47B variable-stability system and the flight-control and cockpit-display programs that were conducted using this aircraft at ARC are reviewed. Another U.S Army helicopter, a Sikorsky UH-60A Black Hawk, was selected as the baseline vehicle for the RASCAL. The research programs that influence the design of the RASCAL are summarized, and the resultant requirements for the RASCAL research system are described. These research programs include investigations of advanced, integrated control concepts for achieving high levels of agility and maneuverability, and guidance technologies, employing computer/sensor-aiding, designed to assist the pilot during low-altitude flight in conditions of limited visibility. The approach to the development of the new facility is presented and selected plans for the preliminary design of the RASCAL are described.

N92-29110*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.

IN-FLIGHT SIMULATION STUDIES AT THE NASA DRYDEN FLIGHT RESEARCH FACILITY

MARY F. SHAFER Jul. 1992 20 p Presented at the AIAA Simulation Technology Conference, New Orleans, LA, 12-14 Aug. 1991

(Contract RTOP 505-64-30)

(NASA-TM-4396; H-1833; NAS 1.15:4396) Copyright Avail: CASI HC A03/MF A01

Since the late 1950's, the National Aeronautics and Space Administration's Dryden Flight Research Facility has found in-flight simulation to be an invaluable tool. In-flight simulation has been used to address a wide variety of flying qualities questions, including low-lift-to-drag ratio approach characteristics for vehicles like the X-15, the lifting bodies, and the Space Shuttle; the effects of time delays on controllability of aircraft with digital flight-control systems, the causes and cures of pilot-induced oscillation in a variety of aircraft, and flight-control systems for such diverse aircraft as the X-15 and the X-29. In-flight simulation has also been used to anticipate problems and to avoid them and to solve problems

once they appear. Presented here is an account of the in-flight simulation at the Dryden Flight Research Facility and some discussion. An extensive bibliography is included.

Author

N92-29180# Battelle Memorial Inst., Columbus, OH.
GENERATION OF SPECTRA AND STRESS HISTORIES FOR
FATIGUE AND DAMAGE TOLERANCE ANALYSIS OF
FUSELAGE REPAIRS Final Report

DAVID BROEK, SAMUEL H. SMITH, and RICHARD C. RICE Oct. 1991 55 p

(Contract DTRS-57-89-C-00006)

(AD-A250390; DOT/VNTSC-FAA-91-16) Avail: CASI HC A04/MF A01

This report describes a simplified procedure for the development of stress histories for use in the analysis of aircraft repairs. This report concentrates on stress histories for fuselage skin repairs. A description of typical fuselage loadings is provided. and basic fuselage stress histories are described. A method for development of an exceedance diagram for analysis of fuselage skin repairs is detailed. Subsequently, a methodology for generating detailed stress histories is reviewed. Some of the key features are (1) the inclusion of a range of flights of different severities, (2) the inclusion of deterministic loads where they occur, e.g., ground-air-ground cycles, (3) the use of a near-optimum number of stress levels (10-16 positive and negative), (4) the combination of positive and negative excursions of equal frequency, and (5) matching of the total number of flights and cycles with the total exceedance diagram. Two methods of estimating fuselage skin stresses are presented, the first based on static equilibrium requirements and the second based on a limit load analysis. A comparison of the proposed history generation scheme with that of an airframe manufacturer for the KC-135 is also presented. The predicted fatigue crack growth patterns for a hypothetical through crack at a fastener hole are compared for the two history generation schemes at three areas within a fuselage.

N92-29417*# National Aeronautics and Space Administration.

Ames Research Center, Moffett Field, CA.

IMPROVING DESIGNER PRODUCTIVITY

GARY C. HILL Feb. 1992 13 p

(Contract RTOP 505-69-50)

(NASA-TM-103929; A-92081; NAS 1.15:103929) Copyright

Avail: CASI HC A03/MF A01

Designer and design team productivity improves with skill, experience, and the tools available. The design process involves numerous trials and errors, analyses, refinements, and addition of details. Computerized tools have greatly speeded the analysis, and now new theories and methods, emerging under the label Artificial Intelligence (AI), are being used to automate skill and experience. These tools improve designer productivity by capturing experience, emulating recognized skillful designers, and making the essence of complex programs easier to grasp. This paper outlines the aircraft design process in today's technology and business climate, presenting some of the challenges ahead and some of the promising AI methods for meeting these challenges.

Author

N92-29511# Washington Univ., Seattle. Dept. of Mechanical

Engineering.
TEAR STRAPS IN AIRPLANE FUSELAGE

M. KOSAI, A. S. KOBAYASHI, and M. RAMULU Mar. 1992

(Contract N00014-89-J-1276)

(AD-A248543; UWA/DME/TR-92/68) Avail: CASI HC A03/MF A01

A procedure based on dynamic fracture mechanics is proposed for assessing the effectiveness of tear straps in a rupturing airplane fuselage weakened by a row of multiple site damage (MSD). A large deformation, elastic-plastic finite element model of the rupturing fuselage with an unsymmetrical crack flap is used to demonstrate the existence of a mixed mode 1 and 2 crack tip deformation and a large axial stress preceding the propagating crack. These numerical results were used to evaluate the dynamic

crack curving and crack arrest criteria and hence to assess the possibility of crack curving as the crack approaches a tear strap without the presence of MSD.

N92-29616# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

RESULTS OF A FLIGHT SIMULATOR EXPERIMENT TO ESTABLISH HANDLING QUALITY GUIDELINES FOR THE DESIGN OF FUTURE TRANSPORT AIRCRAFT

J. A. J. VANENGELEN 8 Jul. 1988 18 p Presented at the AIAA Flight Mechanics Conference, Minneapolis, MN, 15-17 Aug. 1988

(NLR-MP-88044-U; GARTEUR-TP-051; ETN-92-91514) Avail: CASI HC A03/MF A01

An experiment on a flight simulator is presented. The main results are discussed and compared with the contemporary handling qualities criteria used to design the flight control system. The experiment was defined and executed in moving base flight simulator. Emphasis of this experiment was put on longitudinal handling qualities. Test pilots evaluated 2 primary and 2 backup systems during a 3 day period in 2 levels of environment disturbances. Fully electrical fly by wire flight control systems stabilize the aircraft and enable the pilot to directly control a predetermined flight parameter. The necessary control surface deflection is determined by an onboard computer. For such advanced aircraft it is imperative to investigate whether existing handling qualities criteria can still be used for the design of primary and backup system, and particularly, whether guidelines are required to cover the change introduced when a failure occurs and the flight control system reverts to a backup system with different characteristics. **ESA**

N92-29650# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Aircraft Div.

CONCURRENT ENGINEERING IN DESIGN OF AIRCRAFT STRUCTURES

J. KRAMMER, O. SENSBURG, J. VILSMEIER, and G. BERCHTOLD 27 Sep. 1991 36 p Presented at the 73rd AGARD Structures and Materials Panel Meeting, San Diego, CA, 7-11 Oct. 1991

(MBB-FE-2-S-PUB-472; ETN-92-91500) Copyright Avail: CASI HC A03/MF A01

The concurrent engineering idea in design of aircraft structures is explained and its meaning is depicted by showing several examples from the design and manufacturing process for new airplanes. Time and cost savings can be achieved if the concurrent engineering philosophies are also applied very early to cover reliability and supportability aspects.

N92-30209*# Old Dominion Univ., Norfolk, VA. Dept. of Mechanical Engineering and Mechanics.

NONLINEAR ANALYSES OF COMPOSITE AEROSPACE STRUCTURES IN SONIC FATIGUE Progress Report, 16 Dec. 1991 - 15 Jun. 1992

CHUH MEI 15 Jun. 1992 13 p

(Contract NAG1-1358)

(NASA-CR-190565; NAS 1.26:190565) Avail: CASI HC A03/MF A01

The primary research effort of this project is the development of analytical methods for the prediction of nonlinear random response of composite aerospace structures subjected to combined acoustic and thermal loads. The progress, accomplishments, and future plans of three random response research topics are discussed, namely acoustics-structure interactions using boundary/finite element methods, nonlinear vibrations of beams and composite plates under harmonic and random excitations, and numerical simulation of the nonlinear response of composite plates under combined thermal and acoustic loading. Author

06

AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

A92-44922

EICAS IN AN INTEGRATED COCKPIT

JANALEE M. KOSOWSKI (Rockwell International Corp., Cedar Rapids, IA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 166-171. refs

The primary objective of all the information that is available in the modern commercial cockpit is to fly the aircraft safety by providing the pilot with the pertinent information needed, when it is needed. The secondary objective is to operate the aircraft efficiently. Because of these objectives, the goal of EICAS (Engine Indication Crew Alerting System) is to assist the pilot in assimilating, interpreting, prioritizing, and acting upon the large amount information that is available. In the design phase of an EICAS development program, careful attention must be paid to the various methods used to present information to the pilot. Since the largest portion of all air traffic accidents are attributed to 'pilot error', careful attention to human factors during the design phase of these cockpit information systems will help reduce the potential for these types of errors.

A92-44923

ELECTRONIC PRESENTATION OF INSTRUMENT APPROACH INFORMATION

MARK G. MYKITYSHYN, JAMES K. KUCHAR, and R. J. HANSMAN, JR. (MIT, Cambridge, MA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 172-177. refs (Contract FAA-ADS-210; DTRS-57-88-C-0078)

Experiments were designed to study several human factors issues associated with the presentation of high density Instrument Approach Plate (IAP) navigation information to the pilot that are induced by the capabilities, flexibilities, and limitations of electronic systems. The experiments were designed to address issues that include the impact of presentation modalities on pilot preference and information retrieval performance. Preliminary results indicate that there appears to be no loss of performance and possibly a limited gain in performance when the IAP information is presented electronically.

R.E.P.

A92-44929 THE STANDARDIZATION OF MILITARY HEAD-UP DISPLAY SYMBOLOGY

LISA F. WEINSTEIN and WILLIAM R. ERCOLINE (Krug Life Sciences, San Antonio, TX) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 210-215. refs

Although initially intended for the presentation of landing and weapons delivery information, the HUD has evolved into a flight instrument that researchers and pilots claim is successfully replacing many of the traditional panel instruments. Since the Attitude Awareness Workshop of 1985, USAF had conducted numerous research projects to determine the most effective wav to integrate the HUD with the other mission-essential instrument displays. The requirement to use the HUD for instrument flight, as well as a need to determine the optimal layout for the HUD symbols, has prompted a significant portion of that research. This paper summarizes many of the research efforts conducted, conclusions reached, and issues yet to be resolved. In addition, the paper outlines the current USAF position for using the HUD. Suggested standardization guidelines based on empirical findings are discussed, including: the use of vertical and horizontal asymmetry for pitch-ladder configurations, quickening, and counter-pointers for airspeed and altitude indicators. Current research efforts that will be completed in the coming year are also described. These efforts include simulator studies and inflight validation. Author

A92-45374

RADIOALTIMETER RWL-750 [RADIOWYSOKOSCIOMIERZ RWL-750]

ANDRZEJ ZAKRENT (Instytut Lotnictwa, Warsaw, Poland) Instytut Lotnictwa, Prace (ISSN 0509-6669), no. 128, 1992, p. 38-60. In Polish. refs

The principle of operation of a radioaltimeter with a continuous frequency-modulated wave as well as sources of errors of these devices are discussed. Construction of a new radioaltimeter, type RWL-750, is described with particular regard to the interference eliminating system. The original impulse selector considerably simplifies the radioaltimeter signal processing system. Results of in-flight tests of radioaltimeter RWL-750 prototyes are presented.

Author

A92-45449

A SIMULATOR STUDY OF A FLIGHT REFERENCE DISPLAY FOR POWERED-LIFT STOL AIRCRAFT

KEIJI TANAKA, HIROYASU KAWAHARA, MASARU NAKAMURA, and YUSHI TERUI (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 805-814. refs (SAE PAPER 912067) Copyright

The display design was aimed at providing pilots with new control cues for keeping its flight safety in low-speed and high-power approach. The display utilizes the angle of attack, pitch angle, and airspeed to indicate the flight reference for maintaining the flight safety margins. The display integrates the flight reference into an analogue airspeed scale. Results of the piloted simulation confirmed that performance of the display was satisfactory for both flight reference tracking and safety margin monitoring, and proper values of coefficients of the display equations were obtained.

Author

A92-46227

A HIGH-PERFORMANCE LLLTV CCD CAMERA FOR NIGHTTIME PILOTAGE

GEORGE M. WILLIAMS, JR. (ITT Defense, ITT Electro-Optical Products Div., Roanoke, VA) IN: Electron tubes and image intensifiers; Proceedings of the Meeting, San Jose, CA, Feb. 10, 11, 1992. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1992, p. 14-32. refs

An intensified CCD is shown to provide optimal performance available for low light level TV application by eliminating all fiberoptic-to-fiberoptic interfaces and improving gain and resolution. Fabricating the fiberoptic taper into the vacuum of the image tube allows for only one optical coupling - at the CCD surface. During the fabrication, the fiberoptic taper pore size and orientation is maximized to provide optimal MTF and reduce more patterns. The high resolution and high sensitivity overcomes the shortcomings that normally prohibit the use of intensified CCD cameras while providing imagery comparable to that of the Aviator Night Vision Imaging System.

A92-46243

FIBRE OPTIC ROTARY POSITION SENSORS FOR VEHICLE AND PROPULSION CONTROLS

PETER T. GARDINER (Smiths Industries Aerospace & Defence Systems, Ltd., London, England) IN: Integrated optics and optoelectronics II; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 200-210. Copyright

The requirements for displacement sensing and the way in which fiber-optic sensing technology can be harnessed to meet these requirements are examined. A particular design technique,

a WDM digital encoding structure, is reviewed. A schematic of a typical aircraft control system is shown which illustates where displacement sensors are needed, both for pilot input and for positional feedback in actuators. Parameters include: point measurement, high precision (0.1 resolution, +/- 0.5 percent accuracy), absolute measurement (no recalibration after power down, compact rugged package, and interchangeability). The device can provide an unambiguous absolute reading of physical parameters, immune to source fluctuations and varying losses in the system.

A92-46244* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

FIBER OPTIC CONTROLS FOR AIRCRAFT ENGINES - ISSUES AND IMPLICATIONS

SAMHITA DASGUPTA, GARY L. POPPEL, and WILLIAM P. ANDERSON (GE Aircraft Engines, Cincinnati, OH) IN: Integrated optics and optoelectronics II; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 211-222. refs (Contract NAS3-25344)

Copyright

Some of the issues involved with the application of fiber-optic controls for aircraft engines in the harsh operating environment are addressed, with emphasis on fiber-optic temperature, pressure, position, and speed sensors. Criteria are established to evaluate the optical modulation technique, the sensor/control unit interconnection, and the electrooptic architecture. Single mode and polarization dependent sensor types, sensors which depend on the reflection and/or transmission of light through the engine environment, and intensity-based analog sensors are eliminated as a possible candidate for engine implementation. Fiber-optic harnesses tested for their optical integrity, temperature stability, and mechanical strength, exhibit a capacity to meet mechanical strength requirements and still gain a significant reduction in cable weight.

A92-46246* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

POTENTIAL FOR INTEGRATED OPTICAL CIRCUITS IN ADVANCED AIRCRAFT WITH FIBER OPTIC CONTROL AND MONITORING SYSTEMS

ROBERT BAUMBICK (NASA, Lewis Research Center, Cleveland, OH) IN: Integrated optics and optoelectronics II; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 238-250. refs

Copyright

The current Fiber Optic Control System Integration (FOCSI) program is reviewed and the potential role of IOCs in FOCSI applications is described. The program is intended for building, environmentally testing, and demonstrating operation in piggyback flight tests (no active control with optical sensors) of a representative sensor system for propulsion and flight control. The optical sensor systems are to be designed to fit alongside the bill-of-materials sensors for comparison. The sensors are to be connected to electrooptic architecture cards which will contain the optical sources and detectors to recover and process the modulated optical signals. The FOCSI program is to collect data on the behavior of passive optical sensor systems in a flight environment and provide valuable information on installation and maintenance problems for this technology, as well as component survivability (light sources, connectors, optical fibers, etc.).

C.A.B.

A92-46247

THE USE OF OPTICAL SENSORS AND SIGNAL PROCESSING GAS TURBINE ENGINES

IAN DAVINSON (Rolls-Royce, PLC, Derby, England) IN: Integrated optics and optoelectronics II; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 251-265. refs Copyright

The paper describes the application of optical measurement techniques to aircraft engine testing, including measurement profiles for turbine blade tip clearance, compressor blade vibration, fan blade profile, turbine blade temperature, and flow diagnostics. The signal and data processing associated with these techniques is emphasized and the prospects for further extending the use of optical methods on ground test and flight engines is discussed. The possibility of applying optical processing techniques is also addressed, with emphsis on high-temperature pressure sensors, efficiency measurements in multistage compressors, improved shaft timing probes, control sensors, and optical signal processing.

C.A.B.

A92-46449

THROUGH THE LOOKING GLASS

HARRY HOPKINS Flight International (ISSN 0015-3710), vol. 141, no. 4321, June 3, 1992, p. 27-30.

A review is presented of the development that has evolved in electronic flight instrument systems since the first civil color system saw commercial service a decade ago. Attention is given to the development of an electronic library system to integrate various data from navigation agencies, manufacturers and operators.

R.E.P.

A92-46736

WIDEBAND CONTROL OF GYRO/ACCELEROMETER MULTISENSORS IN A STRAPDOWN GUIDANCE SYSTEM

PIERRE CONSTANCIS (Societe d'Applications Generales d'Electricite et de Mecanique, Cergy-Pontoise, France) and MICHEL SORINE (INRIA, Le Chesnay, France) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 855-860. Previously cited in issue 23, p. 3614, Accession no. A89-52540. refs Copyright

A92-46792 National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

AIRDATA CĂLIBRATION TECHNIQUES FOR MEASURING ATMOSPHERIC WIND PROFILES

EDWARD A: HAERING, JR. (NASA, Flight Research Center, Edwards, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 632-639. Previously announced in STAR as N90-14228. refs

(Contract RTOP 505-68-31)

Copyright

The research airdata system of an instrumented F-104 aircraft has been calibrated to measure winds aloft in support of the Space Shuttle wind measurement investigation at the National Aeronautics and Space Administration Ames Research Center Dryden Flight Research Facility. For this investigation, wind measurement accuracies comparable to those obtained from Jimsphere balloons were desired. This required an airdata calibration more accurate than needed for most aircraft research programs. The F-104 aircraft was equipped with a research pilot-static noseboom with integral angle-of-attack and flank angle-of-attack vanes and a ring-laser-gyro inertial reference unit. Tower fly-bys and radar acceleration-decelerations were used to calibrate Mach number and total temperature. Angle of attack and angle of side slip were calibrated with a trajectory reconstruction technique using a multiple-state linear Kalman filter. The F-104 aircrat and instrumentation configuration, flight test maneuvers, data corrections, calibration techniques, and resulting calibrations and data repeatability are presented. Recommendations for future airdata systems on aircraft used to measure winds aloft are also given. Author

A92-47538

COMMON AIRBORNE INSTRUMENTATION SYSTEM (CAIS)

RAYMOND J. FAULSTICH (U.S. Navy, Naval Air Test Center, Patuxent River, MD) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7,

1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 471-478.

Copyright

The principal design features and the main components of the CAIS system, which is being developed to meet the flight test needs of the Air Force, Army, and Navy into the 21st century, are described. The CAIS is conceived as a time-division multiplexed data acquisition system comprised of a standard modular complement of hardware and software and intended for use on both existing and future aircraft. CAIS will not be airframe or weapon system dependent nor will its use be restricted to any test and evaluation activity. The proposed system architecture insures CAIS longevity through its openness and flexibility to accomodate future requirements.

A92-47560

MODERN TECHNIQUES FOR MONITORING AIRBORNE TELEMETRY

HAIM BERGER and JACOB SCHECHTER (Israel Aircraft Industries, Ltd., Beer Yaakov) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 693-703.

Copyright

A new integration concept for telemetry systems is proposed whereby various sensors, buses, and distributed processing subsystems are integrated into a single serial bus using a master/slave configuration. The approach is based on the use of the PCM Frame formatter (PFF) VLSI chip, which can be installed in each subsystem, CPU board, or PCM multiplexer. The PFF can operate as a stand-alone device in a single acquisition system or be networked in a master/slave configuration. The advantages of the integrated method are discussed.

A92-48041 FIBER-OPTIC POSITION TRANSDUCERS FOR AIRCRAFT CONTROLS

WALTER L. GLOMB, JR. (United Technologies Research Center, East Hartford, CT) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 162-164. refs

Copyright

Results of 15-year development of fiber-optic position transducers for aircraft controls are reviewed. Special attention is given to the performance requirements for position transducers and the variety of presently available fiber-optic position transducer technologies (including digital optical code plates, analog optical code plates, chirped diffraction gratings, macrobend loss coils, polarizers, interferometers, and optically powered electronic sensors). The performances of these devices are compared and flight test experience is reviewed.

A92-48042

APPLICATION OF ANALOG FIBER OPTIC POSITION SENSORS TO FLIGHT CONTROL SYSTEMS

GLEN E. MILLER (Boeing Aerospace and Electronics High Technology Center, Seattle, WA) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 165-173. refs

Copyright

The relative advantages and disadvantages of analog and digital fiber-optic sensors as they apply to flight controls are examined. It is concluded that, if it were not for high connector loss, several existing analog sensor designs would be satisfactory. A novel analog sensor is described, which incorporates corrections of several deficiencies commonly associated with fiber-optic analog sensors.

A92-48043

MULTI-ANALOG TRACK FIBER COUPLED POSITION SENSOR RAYMOND W. HUGGINS (Boeing Aerospace and Electronics High

Technology Center, Seattle, WA) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 174-180. refs
Copyright

A high-precision fiber-coupled resolver is described which incorporates a new mechanical analog encoding concept: the resolver has three variable modulus (6, 10, 15) analog tracks encoded using a weighted number system. The resolver uses a simple optical system and wavelength division multiplexing and is capable of 0.1 deg resolution, while requiring only 3 percent analog stability. Degradation characteristics of the resolver compare favorably with those of an analog sensor.

A92-48044

FIBER OPTIC SPEED SENSOR FOR ADVANCED GAS TURBINE ENGINE CONTROL

DEEPAK VARESHNYA, JOHN L. MAIDA (Teledyne Ryan Electronics, San Diego, CA), and MARK A. OVERSTREET (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 181-191. refs Copyright

A fiber optic speed sensor (FOSS) has been developed, bench tested and rig tested in a real turbine airflow environment. The FOSS employs an innovative design using a pressure tube and fiber optic microbend transducer in order to capture turbine blade pass wake frequency. The blade pass frequency can be converted by a signal processor into turbine rotational speed. The FOSS offers unique potential to meet future requirements for performance (0 to 25 KHz) and environmental tolerance (1200 F temperatures and EMI/EMP threats). Future efforts include development of the signal processor and environmental/durability testing focused on developing reliable, long life operation in the hostile environment of an advanced gas turbine engine.

A92-48046

WAVELENGTH ENCODED FIBER OPTIC ANGULAR DISPLACEMENT SENSOR

WILLIAM B. SPILLMAN, JR., ROBERT E. RUDD, III, FREDERICK G. HOFF, DOUGLAS R. PATRIQUIN, and JEFFREY R. LORD (Simmonds Precision Aircraft Systems, Vergennes, VT) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 197-203. refs Copyright

The fiber-optic angular displacement sensor which will be employed in new (i.e., introduced after 1995) commercial aircraft is described with special attention given to the theory of sensor operation. The device utilizes the wavelength filtering properties of diffraction gratings that are fabricated to have periods that vary along the grating length. The diffraction grating is attached to the interior of a rotatable element; rotation of the element or anything to which it is attached has the result that the bandpass wavelength of the sensor is modulated due to the change in the grating segment being illuminated. The sensor performance was quantified experimentally, and a comparison is made between this sensor and the existing sensor technology.

A92-48047

FIBER-OPTIC PRESSURE SENSOR SYSTEM FOR GAS TURBINE ENGINE CONTROL

LAURENCE N. WESSON, NELLIE L. CABATO, NICHOLSON L. PINE (Aurora Optics, Inc., Blue Bell, PA), and VICTOR J. BIRD (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) IN: Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 204-213. Research supported by General Motors Corp. refs Copyright

The design and the principles of operation of a high-performance fiber-optic pressure sensor system being developed for

gas-turbine-engine control are described. The system consists of four sensors, which convert differential pressure into bending stress in transparent plates; the bending stress is then measured by its effect on polarized light transmitted through the plates. The sensors are designed for accurate on-engine operation at temperatures from -55 to +800 C. The sensor design employs fused silica and Inconel 718, and the fiber cable materials include metal-coated fiber, ceramics, and stainless steel.

A92-48427

MODULAR AVIONICS - A COMMERCIAL PERSPECTIVE

JOHN R. TODD (Douglas Aircraft Co., Long Beach, CA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 36-42.

Copyright

Modular avionics are in the process of supplanting traditional LRU (line replaceable unit) based avionics on new military aircraft and will see initial applications on commercial transport aircraft in the mid to late 1990s. The author discusses the major considerations which must be addressed for modular avionics on commercial transport aircraft as well as the needs of commercial versus military modular avionics systems. Douglas Aircraft Company's work in commercial modular avionics is summarized and some thoughts on architectures and implementation are provided.

A92-48473

RAPID SYSTEMS INTEGRATION OF NAVIGATION AVIONICS

LARRY ZETZL (U.S. Navy, Naval Avionics Center, Indianapolis, IN), ANDREW FULLER (SofTech, Inc., Fairborn, OH), and ROGER ANDREWS (Merit Technology, Beavercreek, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 394-399.

The authors illustrate the techniques and philosophies of using simulations as a tool to help reduce the cost and schedule associated with navigation system integration. The ES-3A navigation integration is used to illustrate specific implementation considerations and lessons learned. The approach for this project was to reuse generic aircraft flight simulation software developed under previous programs and add avionics modules unique to this platform as needed. It is concluded that the DASL (Digital Avionics System Laboratory) has been a valuable asset in testing and integrating the ES-3A navigation and steering software. The lab offered a dynamic environment in which to test the entire navigation effort of the flight computer in high-risk situations which could not be tested during flight test. The environment made it possible to prove the fault-tolerance of the navigation and steering software prior to flight test.

A92-48475

DESIGN AND IMPLEMENTATION OF A GENERIC KALMAN FILTER IN ADA

LESLIE HYLL and LARRY GEARHART (TRW Dayton Engineering Laboratory, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 408-414. Research sponsored by U.S. Navy. refs

(Contract F33615-87-D-1451)

Copyright

The Sandia Inertial Terrain-Aided Navigation (SITAN) system provides a means of autonomous and semi-passive navigation which integrates a stored terrain model with an inertial reference and and terrain sensors. The authors define the approach taken in the ITB (Integrated Test Bed) project to implement SITAN in Ada, to highlight the core software-a generic Kalman filter package-and to show the relevance of the approach to upgrading and adapting the implementation. Several key ideas of software

design are emphasized. A design for a generic Ada Kalman filter is presented which is relevant to general Kalman filtering applications.

A92-48477

AN INTEGRATED NAVIGATION SYSTEM MANAGER USING FEDERATED KALMAN FILTERING

S. A. BROATCH and A. J. HENLEY (GEC Avionics, Ltd., Guidance Systems Div., Rochester, England) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 422-426. Research supported by Ministry of Defence Procurement Executive. refs

A federated Kalman filter architecture has been developed in which the Kalman filter processing is distributed among the navigation sensors to be integrated. Each navigation sensor with its Kalman filter can, in conjunction with the reference INS (Inertial Navigation System), be consdiered as a subsystem which functions as an independent manager. A central data fusion function is used to integrate the information from these navigators. Such a federated architecture can offer a number of advantages over one with a single central Kalman filter. These advantages include improved failure detection and correction, improved redundancy management, and lower costs for system integration. GEC Avionics has developed a system for the integration of INS with GPS (Global Positioning System) and TRN (Terrain Referenced Navigation), together with other navigation aids. Results are presented to demonstrate the performance and the benefits of using a federated approach.

A92-48501

ABSOLUTE FIBER OPTIC PRESSURE TRANSDUCER FOR AIRCRAFT AIR DATA MEASUREMENT

S. E. REED and J. W. BERTHOLD (Babcock & Wilcox, Alliance, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 591-603. refs Copyright

The authors present the design rationale for a total pressure fiber optic transducer under development for planned flight test. Pressure sealing problems for absolute pressure transduction are discussed. Information is given on the microbend fiber optic sensor approach used to measure diaphragm deflection, and requirements for microbend sensor thermal compensation. Wavelength division multiplexing (WDM) approaches are described to self-reference the fiber optic sensors so that the transducer output is insensitive to interconnect cable bending and connector mating/demating. Requirements and constraints imposed by the WDM methods are discussed, along with the impact on overall transducer operation. Preliminary performance data are presented on a prototype transducer incorporating the features necessary to achieve a stable, repeatable, and accurate output.

A92-48567

THE IMPORTANCE OF IMPLICIT AND EXPLICIT KNOWLEDGE IN A PILOT'S ASSOCIATE SYSTEM

DAVID L. PERSCHBACHER, KEITH R. LEVI (Honeywell Systems and Research Center, Minneapolis, MN), and MARK HOFFMAN (ISX Corp., Marietta, GA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 1158-1163. refs (Contract F33615-88-C-1739)

It is pointed out that fielding an operational pilot's associate (PA) will require both implicit and explicit representations of knowledge. Speed and memory performance requirements for PA will be aided by the use of implicit representations of knowledge. Acquiring and maintaining the large knowledge bases for PA will, by contrast, be aided by having explicit knowledge representations. Such explicit representations are being investigated in a 10

person-year research project sponsored by the Wright Research and Development Center. A critical contribution of this research has been to develop concepts that make machine learning applicable to real-time control and execution systems such as pilot's associate. The authors describe how machine learning techniques can automatically transform explicit representations into the implicit representations required by PA.

I.E.

A92-49022#

EXPERIMENTAL PYROMETER SYSTEM FOR A GAS TURBINE ENGINE

EDWARD A. FISHER (GE Aircraft Engines, Cincinnati, OH) and TIMOTHY J. LEWIS (USAF, Wright-Patterson AFB, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. Research sponsored by USAF. refs

(AIAA PAPER 92-3482) Copyright

The design and testing of an advanced two-color optical pyrometer (ATCOP) as well as the associated processing algorithms and hardware are summarized. The ATCOP which is based on fiber-optics, digital filtering, and the Ada programming language shows the feasibility of real-time processing of noisy turbine blade temperature signals for engine control and diagnostics. Temperature profiles of individual turbine blades are displayed on the system's monitor. Hot or cold turbine blades are detected through recognizing any significant deviation from the repetitive blade temperature pattern. It is shown how the pyrometer system can be integrated with an aircraft engine digital control unit.

O.G.

N92-28376# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Avionics Panel.

APPLICATIONS OF ASICS TO AVIONICS

Feb. 1992 49 p

(AGARD-AG-329; ISBN-92-835-0657-X) Copyright Avail: CASI HC A03/MF A01

An overview of how Application Specific Integrated Circuits (ASICs) can be a key factor in avionics systems is presented. The technical capabilities and possibilities of ASICs in avionics applications are discussed along with the essential characteristics and various types of ASICs that are available. The computer aided design (CAD) tools necessary for the rapid development of ASICs are discussed. Two specific examples of applications are cited: (1) the imbedded computers necessary for airborne radar digital signal processing; and (2) the ASIC role in image processing for aircraft cockpits.

N92-28377# Thomson Composants, Saint Egreve (France). WHAT IS AN ASIC?

J. M. BRICE and J. REDOLFI /n AGARD, Applications of ASICs to Avionics 7 p Feb. 1992

Copyright Avail: CASI HC A02/MF A01

Since the emergence of the first ASICs in 1975, many advances have occurred in this field. This has resulted in highly complex digital ASICs and very high speed analog circuits. This strong evolution did not really change the nature of the four ASIC families: full custom circuits, standard cells, programmable devices, and PLD's.

N92-28379# Micro Circuit Engineering Ltd., Tewkesbury (England).

APPLICATIONS OF SILICON HYBRID MULTI-CHIP MODULES TO AVIONICS

E. S. ECCLES In AGARD, Applications of ASICs to Avionics 14 p Feb. 1992

Copyright Avail: CASI HC A03/MF A01

Silicon-based multi-chip modules (MCMs) are an inevitable byproduct of reduced feature size and higher speed integrated circuit (IC) devices. Early versions are available and are being exploited in military and high performance commercial applications. Their use will proliferate rapidly over the next four years and is likely to extend the use of monolithic ICs into performance areas which were previously inaccessible.

N92-28380# Thomson-CSF, Montrouge (France). Direction Recherche et Technologie.

A RADAR SIGNAL PROCESSING ASIC AND A VME INTERFACE CIRCUIT

A. CHOCHOD In AGARD, Applications of ASICs to Avionics 6 p Feb. 1992

Copyright Avail: CASI HC A02/MF A01

The purpose of this circuit is to perform real time signal processing for radar applications such as a missile seeker. There are two operating modes (standard and sample accumulation) and a variety of options through user selectable parameters and control logic (i.e. detection with global, local, or fixed threshold). Author

N92-28644# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

A SIMPLE AND LOW COST SYSTEM TO MEASURE DELAY TIMES IN PNEUMATIC SYSTEMS

S. STORMVANLEEUWEN 19 May 1990 19 p

(NLR-TP-90174-U; ETN-92-91438) Avail: CASÍ HC A03/MF A01 A methodology to measure pneumatic delay times based on the determination of the complex transfer function of the pressure line in the frequency range of interest is described. From the transfer function, the delay time as a function of the frequency can be calculated. The transfer function is established by measuring the amplitude and phase response of the pressure system at a number of discrete frequencies. The equipment to generate a pneumatic stimulus and the equipment to determine the amplitude and phase response is described.

N92-28654# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

POTENTIAL APPLICATIONS OF LASER DOPPLER ANEMOMETRY FOR IN-FLIGHT MEASUREMENTS

H. W. JENTINK 9 May 1990 32 p

(NLR-TP-90163-U; ETN-92-91437) Avail: CASI HC A03/MF A01 The application of laser anemometry for flight testing and other

aircraft related measurements is addressed. The laser anemometry technique and previous work in this field are reviewed and applications are described. A comparison of possibilities of laser anemometry with conventional techniques shows some unique advantages of laser anemometry.

N92-29222# Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.

DEVELOPMENT OF A FLIGHT INFORMATION SYSTEM USING THE STRUCTURED METHOD M.S. Thesis

YEONG-LAE KWAK Mar. 1992 106 p

(AD-A248207; AFIT/GCS/ENG/92M-03) Avail: CASI HC A06/MF A02

This thesis documents the development of a database system for the Flight Information System (FIS) of the Korean Air Force. The scope of the FIS is too large to be covered by this thesis. Thus, this thesis covers only the core part of the FIS due to the limitation of time and man-power. This thesis uses the structured method. Structured analysis and structured design techniques are the two techniques most used. This thesis focused not only the development of the FIS but also the application of the software development method, the structured method, and its tools such as DFD, DD, ERD, and so on. Also, the use of ORACLE was an important part of this thesis too.

N92-29870# Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Abt. Flaechenflugzeuge. SENSOR FAULT DETECTION ON BOARD AN AIRCRAFT WITH OBSERVER AND POLYNOMIAL CLASSIFIER Ph.D. Thesis - Technische Univ. [SENSORFEHLERERKENNUNG IN FLUGZEUGEN MIT BEOBACHTER UND POLYNOMKLASSIFIKATOR]

JOERG J. BUCHHOLZ Aug. 1991 65 p In GEORGIAN (ISSN 0939-2963)

(DLR-FB-91-34; ETN-92-91390) Avail: CASI HC A04/MF A01; DLR, Wissenschaftliches Berichtswesen, Postfach 90 60 58, 5000 Cologne, Fed. Republic of Germany, HC

A sensor fault detection method for the airspeed vector of an aircraft is described. A nonlinear estimator uses a mathematical aircraft motion model and a few measured signals to generate an estimate of the airspeed vector to be monitored. This reference signal and the measurement signal are fed into a learning pattern recognition algorithm, which determined the state of the sensor from the differences between the two signals. In a practical realization, the classifier is parallelized, implemented on a transputer network, and verified using flight test data.

07

AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

A92-44898

FUEL REGRESSION MECHANISM IN A SOLID FUEL RAMJET ILAN HADAR and ALON GANY (Technion - Israel Institute of Technology, Haifa) Propellants, Explosives, Pyrotechnics (ISSN 0721-3115), vol. 17, no. 2, May 1992, p. 70-76. refs Copyright

A model relating the combustion characteristics, particularly the regression rate, to the fuel properties in a solid fuel ramjet (SFRJ), is presented. The analysis is based on inspecting the different phenomena (e.g., chemical kinetics and heat transfer) involved in the fuel decomposition process in order to determine the rate controlling steps, and modeling the important mechanisms. Model predictions were compared to experimental findings for four polymeric fuels, showing excellent qualitative agreement in classifying different fuels, as well as good quantitative predictions of the fuel regression rates. The model can serve as a useful tool for the selection of appropriate fuels, as well as for preliminary design of the engine and mission profile prior to static firings of the final SFRJ prototype.

A92-45306 VSTOL ENGINE DESIGN EVOLUTION - GROWTH OF THE **PEGASUS ENGINE FOR HARRIER**

A. B. STREET (Rolls-Royce, PLC, Bristol, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.3.1-II.3.11.

Copyright

The paper traces the evolution of the Pegasus engine since it entered service in 1969 powering the Harrier aircraft. The operational background of the Harrier/AV8 family of aircraft was used to define a demonstrator program primarily aimed at improving performance. This XG15 demonstrator program for the Pegasus 11-61 was successfully completed in 1987 followed by durability demonstrations in early 1988. The results formed the basis of the improved F402-RR-408 engine, offering reduced life cycle costs at higher thrust according to prevailing operational requirements. The main objectives of the XG-15 and 11-61 include the following: 15-percent increase in lift thrusts at 15 C, flat rating of lift thrusts to 32-C conditions, increases in combat thrust at low altitude of at least 20 percent minimal weight increase, double hot end life, and improved modularity and maintainability. The Pegasus 11-61 compressor, combustor, HP turbine, and exhaust system are also discussed. C.A.B.

A92-45307

CURRENT TECHNOLOGY PROPULSION SYSTEMS MEET THE STOVL WINDOW OF OPPORTUNITY

JOHN R. SPRAGUE and JOSEPH A. WAZYNIAK (Pratt & Whitney Group, West Palm Beach, FL) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. II.4.1-II.4.8. refs Copyright

A review of the STOVL propulsion system technologies and their availability is presented, and a demonstrator engine flight clearance program is developed. It is shown that opportunities exist for the production of a cost-effective mission-flexible weapons system to replace the AV-8B and F/A 18 aircraft and as a flexible component of the Air Force's multirole fighter inventory. Based on the ASTOVL and PW5000STOVL evaluation studies carried out over the past four years, a viable STOVL propulsion system based on a derivative of the PW5000 prototype engine can be flown in the mid to late 1990s. It is argued that the derivative engines with the infusion of IHPTET program technologies developed during the STOVL demonstrator and full-scale engine development programs can evolve into a production propulsion system that exceeds the requirements and capabilities of the engines it replaces. C.A.B.

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

HOT GAS INGESTION CHARACTERISTICS AND FLOW VISUALIZATION OF A VECTORED THRUST STOVL CONCEPT ALBERT L. JOHNS, GEORGE H. NEINER, TIMOTHY J. BENCIC (NASA, Lewis Research Center, Cleveland, OH), JOSEPH D. FLOOD, KURT C. AMUEDO, THOMAS W. STROCK, and BEN R. WILLIAMS (McDonnell Aircraft Co., Saint Louis, MO) International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.4.1-III.4.20. refs Copyright

The study presents results obtained at the compressor face of a 9.2-percent scale vectored thrust model in ground effects from Phases I and II of a test program to evaluate the hot ingestion phenomena and control techniques, and to conduct flow visualization of the model flowfield in and out of ground effects, respectively. A description of the model, facility, a new model support system, and a sheet laser illumination system are provided. The findings contain the compressor face pressure and temperature distortions, compressor face temperature rise, and environmental effects of the hot gas. The environmental effects include the ground plane temperature and pressure distributions, model airframe heating, and the location of the ground flow separation. Results from the sheet laser flow visualization test are also presented.

A92-45317 **HOT-GAS REINGESTION - ENGINE RESPONSE CONSIDERATIONS**

D. D. WILLIAMS (Rolls-Royce, PLC, Bristol, England) International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.5.1-III.5.13. Research supported by Ministry of Defence Procurement Executive. refs Copyright

Some of the fundamentals of hot-gas reingestion (HGR) are reviewed in the context of engine stability. Generic time-variant total-temperature distortion descriptors are discussed against a background of external work and of small-and full-scale experience from simulated vertical landings of an augmented Pegasus/Harrier installation. Results are presented vectored-thrust compression-system-component and overall engine simulations intended to provide guidelines to engine total-temperature distortion sensitivity and stability margin assessment. Total-temperature distortion at engine entry resulting from HGR is found to be highly unsteady due to unsteadiness in the flow upwash field as a result of multiple-jet interactions close to the ground. Repeated tests at correctly simulated aircraft dynamic conditions are needed to establish a proper statistical data base. A methodology for the treatment of the effects of HGR on engine stability is developed.

C.A.B.

A92-45321 **ASTOVL ENGINE CONTROL** B. J. QUINN (Rolls-Royce, PLC, Bristol, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.9.1-III.9.6.

A possible engine control architecture for future ASTOVL aircraft is identified. The ASTOVL engine powerplant control requirements are more complex than those of the Pegasus engine in the Harrier. The concept of an engine feeding a plenum chamber for which mixed (and hot) gases are supplied to both front and back lift nozzles is difficult installationally because of its long hot front duct and potential hot gas ingestion effects. The engine control system in this approach is relatively conventional apart from the need to divert gases for either lift or propulsion. The lighter and more integrated engine and aircraft approach using the Pegasus-like configuration is shown to have additional control complexity, but has only relatively small fan surge margin consumption through control effects.

A92-45325* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

EXPERIMENTAL AND ANALYTICAL STUDY OF CLOSE-COUPLED VENTRAL NOZZLES FOR ASTOVL AIRCRAFT

JACK G. MCARDLE (NASA, Lewis Research Center, Cleveland, OH) and C. F. SMITH (Sverdrup Technology, Inc., Cleveland, OH) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.15.1-III.15.14. Previously announced in STAR as N90-24273. refs

Flow in a generic ventral nozzle system was studied experimentally and analytically with a block version of the PARC3D computational fluid dynamics program (a full Navier-Stokes equation solver) in order to evaluate the program's ability to predict system performance and internal flow patterns. Measurements showed about 5.5-percent flow-turning loss, reasonable nozzle performance coefficients, and a significant aftward axial component of throst due to flow turning more than 90 deg. Flow behavior into and through the ventral duct is discussed and illustrated with paint streak flow visualization photographs. PARC3D flow visualization images are shown for comparison with the paint streak photographs. Modeling and computational issues encountered in the analytical work are discussed.

A92-45430

IMPACT RESPONSE OF COMPOSITE UHB PROPELLER BLADES

NOBUO TAKEDA (Tokyo, University, Japan), YOSHIFUMI KAWAKAMI, and REIMON KOBAYASHI (Sumitomo Precision Products Co., Ltd., Amagasaki, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 607-617. refs (SAE PAPER 912046) Copyright

Thirteen kinds of composite plate specimens, including hybrid laminates composed of CFRP and GFRP, were studied by impact testing in cantilever support conditions in order to evaluate their suitability for UHB propeller blades. Teflon projectiles weighing 37 g collided with the specimens at speeds ranging from 20 m/s to 150 m/s. The direction of the projectiles was varied to investigate the effect of impact direction on the specimen response. The strain time histories of the rectangular plate specimens and flat blades were measured and compared with calculations made using the FEM program DYNA3D. As a result of these studies, a hybrid laminate as tough as GFRP was selected as a candidate for the shell material of propeller blades.

A92-45431

AN ANALYSIS OF THE EFFECT OF CENTRIFUGAL FORCE ON THE IMPACT RESISTANCE OF COMPOSITE FAN BLADES FOR TURBO-FAN ENGINES

TOSHIO MIYACHI, HIDEHITO OKUMURA, and KUNIHIKO

OHTAKE (National Aerospace Laboratory, Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 619-626. refs (SAE PAPER 912047) Copyright

In the context of a study of the impact-resistance capacity of composite-material blades for turbofan engines, attention has been given to the effect of centrifugal loading on blade structural response to impact. FEM was used to investigate the bird-strike-generated transient deformations of six different fan-blade types employing various material systems and dimensions. While centrifugal forces significantly reduced the global deformations of the heavier blades studied, local deformations were virtually unaffected. In the case of lighter blades, even the global effects of centrifugal force were negligible.

O.C.

A92-45432 FINITE ELEMENTS ANALYSIS OF FLEXURAL EDGE WAVE FOR COMPOSITE FAN BLADES

HIDEHITO OKUMURA, TOSHIO MIYACHI, MASAHIRO FUKUDA, TAKASHI NAKAMURA, and KUNIHIKO OHTAKE (National Aerospace Laboratory, Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 627-634. refs (SAE PAPER 912048) Copyright

The paper presents a geometrically nonlinear finite element analysis of the dynamic behavior of flexural edge waves of a composite jet-engine fan-blade model. It is shown that computer graphics technology was very efficient to visualize the mode of the edge wave generation and propagation. Results of computer simulation of a composite fan blade subjected to local impact loading with foreign objects (such as gravel, hailstone, or nuts and bolts) confirmed the existence of flexural edge wave in the region of the leading edge and the trailing edge.

A92-45434 ELECTRIC POWER GENERATING SYSTEM FOR THE BOEING 777 AIRPLANE

JOHN BURNS (Sundstrand Electric Power Systems, Rockford, IL) and CARL TENNING (Boeing Commercial Airplane Group, Seattle, WA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 645-656. (SAE PAPER 912050) Copyright

The electric power generating system of the Boeing 777 is described. An overview is given of the main system, including the generators, flight deck controls, and fault protection. The backup electric system and flight deck controls, category IIIb autoland, additional electric services for extended twin operations, simultaneous operation on APU generator and external power, provisions for a second external power receptacle, automatic load shedding and restoration, and simplification of bus fault protection are addressed. The equipment is described, including the integrated drive generator, thermal, disconnect, case venting, APU generator, control units built-in test equipment, and integrated drive generator oil level sensing.

A92-45435

270-VDC/HYBRID 115 VAC ELECTRIC POWER GENERATING SYSTEM TECHNOLOGY DEMONSTRATOR

R. E. NIGGEMANN, S. PEECHER, and G. ROZMAN (Sundstrand Aerospace, Rockford, IL) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 657-663. refs (SAE PAPER 912051) Copyright

The 270-Vdc/hybrid 115-Vac electrical power generating and distribution systems technology for future aircraft applications is presently being investigated. This paper describes a single-channel, 120-kW hybrid system and presents some typical performance

data. The dc bus supplies a 30-kVA, 400-Hz, 115-Vac inverter; constant power load banks of up to 150 kW; and a resistive load bank of up to 90 kW. System simulation studies indicated the potential for unstable operation due to the negative impedance of the constant power load in conjunction with the source ripple filter and the load EMI filters.

Author

A92-45441 AUXILIARY POWER UNITS FOR CURRENT AND FUTURE AIRCRAFT

COLIN RODGERS (Sundstrand Power Systems, San Diego, CA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 717-730. refs

(SAE PAPER 912059) Copyright

The effects on gas turbine turbojet propulsion auxiliary power unit (APU) design of the rapid expansion of commercial aviation, improvements in prime propulsion gas turbine technologies, and the trend to all-electric APU output are discussed. Candidate APU design solutions for coping with these trends are presented. Expected technological improvements for the next century are considered.

A92-46426

HIGH-SPEED FLIGHT PROPULSION SYSTEMS

S. N. B. MURTHY, ED. (Purdue University, West Lafayette, IN) and E. T. CURRAN, ED. (USAF, Wright Laboratory, Wright-Patterson AFB, OH) Washington, DC, American Institute of Aeronautics and Astronautics, Inc. (Progress in Astronautics and Aeronautics. Vol. 137), (ISSN 0079-6050), 1991, 544 p. For individual items see A92-46427 to A92-46435.

(ISBN 1-56347-011-X) Copyright

Various papers on high-speed flight propulsion systems are presented. The topics addressed are: propulsion systems from takeoff to high-speed flight, propulsion system performance and integration for high Mach air-breathing flight, energy analysis of high-speed flight systems, waves and thermodynamics in high Mach number propulsive ducts, turbulent free shear layer mixing and combustion, turbulent mixing in supersonic combustion systems, mixing and mixing enhancement in supersonic reacting flowfields, study of combustion and heat-exchange processes in high-enthalpy short-duration facilities, and facility requirements for hypersonic propulsion system testing.

A92-46427 INTRODUCTION

E. T. CURRAN (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: High-speed flight propulsion systems. Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1991, p. 1-20. refs

Important problems in high-speed flight propulsion systems are surveyed. Major technological challenges in low-speed engines and high-speed propulsion are examined. The integration of the aerodynamic, structural, and propulsion elements of an aircraft to achieve optimum performance is discussed.

C.D.

A92-46429

PROPULSION SYSTEM PERFORMANCE AND INTEGRATION FOR HIGH MACH AIR BREATHING FLIGHT

F. A. HEWITT and M. C. JOHNSON (Rolls-Royce, PLC, Bristol, England) IN: High-speed flight propulsion systems. Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1991, p. 101-142. Research supported by ESA. refs

Factors involved in the interactions between the intakes, nozzles, and powerplants of high Mach number air-breathing aircraft are discussed. Vehicle dynamic pressure and trajectory, air intake pressure recovery, propulsion from takeoff, burner and nozzle relative scale effects, nozzle area variability, and supersonic combustion are addressed.

C.D.

A92-47692

BASIC ANALYSIS OF COUNTER-ROTATING TURBINES

JUN-XIAN CAI (Chinese Academy of Sciences, Institute of Engineering Thermophysics, Beijing, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A57-A63. In Chinese. refs

A comprehensive basic analysis for various counterrotating turbines is given with a blade element assumption. All possible typical schemes of counterrotating turbine stages are enumerated. A typical three specifications of each moving blade for blade element, such as impulse, reactive, and absolute axial intake, is suggested. Their performances of specific work, load distribution, between counterrotating shafts, and efficiency are analyzed for different shaft rotating speed ratios. It is concluded that the load capacity per unit engine length of a counterrotating turbine can be much higher than that of a common turbine without efficiency penalty.

A92-47697

STUDY ON TWO VARIABLE CONTROL PLAN FOR TWIN SPOOL TURBOJET ENGINE

JIA-ZHEN ZHANG, KAI HUA, and XIAN HUANG (Northwestern Polytechnical University, Xian, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 1, Jan. 1992, p. A101-A105. In Chinese. refs

A two-variable control plan for a twin-spool turbojet engine under maximum state is discussed in this paper. The performance of the engine adopting two-variable control plan is calculated with a nonlinear simulation programs. The results show that engine performance with a two-variable control plan is better than that with a single variable plan. When the control plan including equal low pressure rotating speed and equal turbine temperature is adopted, the surge margin of high pressure compressor is reduced. Some problems met in practice for two-variable control system of engine are analyzed.

A92-47791

CONCEPT OF A ONE-DIMENSIONAL MODEL OF THE DYNAMIC BEHAVIOR OF A GAS TURBINE (KONCEPCJA JEDNOWYMIAROWEGO MODELU DO BADANIA WLASNOSCI DYNAMICZNYCH TRUBINY GAZOWEJ)

KONRAD SWIRSKI, JANUSZ LEWANDOWSKI, and ANDRZEJ MILLER (Warsaw University of Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 399-404. In Polish. refs

An approach to the modeling of the dynamic behavior of a gas turbine is proposed whereby the process of working medium accumulation in the flow path of a gas turbine is described in terms of a continuous one-dimensional model. The turbine (compressor) stage is treated as a channel of varying length and cross section. The numerical solution is based on a two-step Lax-Wendroff scheme combined with iterations in the turbine (compressor) sections.

A92-48021

THE IMPACT OF ADVANCED MATERIALS ON SMALL TURBINE ENGINES

JOHN L. MASON (Allied-Signal Aerospace Co., Torrance, CA) Cliff Garrett Turbornachinery Award Lectures, 8th, Dayton, OH, Apr. 23, 1991. 16 p. refs

(SAE PAPER 911207; SAE SP-871) Copyright

The impact of anticipated new turbine materials and processes on the small gas turbine of the late 20th and early 21st century is presented. The materials are evaluated in terms of improvement potential, likelihood of successful initiation, and barriers thereto. Attention is given to evaluation criteria, tradeoffs, and various engine studies focusing on the NASA/Army Small Engine Component Technology studies of the mid-1980s.

R.E.P.

A92-48268

AN EXPERIMENTAL INVESTIGATION ON AFT BYPASS SUPERSONIC INLET PERFORMANCE AT HIGH ANGLE OF ATTACK AND YAW

KEYUN ZHAO (31st Research Institute, People's Republic of China) Journal of Propulsion Technology (ISSN 1001-4055), no. 3, June 1992, p. 35-40. In Chinese.

The experimental results obtained with an aft bypass supersonic inlet model during wind tunnel testing are presented. Attention is focused on inlet performance at high angle of attack and yaw. It is shown that the total pressure measurement under the mixing condition at dump chamber entrance is feasible and the pressure recovery measured is satisfactory. RFP

A92-48481

AN ARTIFICIAL INTELLIGENCE APPROACH FOR THE **VERIFICATION OF REQUIREMENTS FOR AIRCRAFT ELECTRICAL POWER SYSTEMS**

ROBERT GLASS, WALEED SAID, and JAMES THOM (Sundstrand Aerospace, Rockford, IL) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton. OH. May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 455-461. refs Copyright

An expert system shell called Expert Electric Power Simulator (EXEPS) has been implemented for use in verifying the requirements of aircraft electrical power generating systems (EPGS). The requirements are modeled as rules for the inference engine of the shell. Behavioral models of each of the components of the EPGS are used to simulate the hardware response of the system. The combination of rules and behavioral models provide a simulation of the response of the EPGS to external events. By monitoring the system response, errors in the requirements specification can be found.

A92-48743*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

OPERATING CHARACTERISTICS AT MACH 4 OF AN INLET HAVING FORWARD-SWEPT, SIDEWALL-COMPRESSION SURFACES

JULIE A. HUDGENS (Analytical Services and Materials, Inc., Hampton, VA) and CARL A. TREXLER (NASA, Langley Research Center, Hampton, VA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs

(AIAA PAPER 92-3101)

A three-dimensional, forward-swept sidewall-compression inlet has been tested in the Mach 4 Blowdown Facility at the NASA Langley Research Center to examine parameters that affect inlet starting, operability, and performance. The inlet was designed to simultaneously provide good starting and mass capture characteristics through the combination of forward-swept sidewalls and the aft placement of the downstream cowl. Parametrics examined included top surface compression, geometric contraction ratio, sidewall compression angle, boundary-layer thickness on the vehicle undersurface, and cowl position. To simulate combustion effects on inlet operation, the inlet was mechanically back pressured to determine maximum achievable combustor-to-inlet pressure ratio prior to inlet unstart. Inlet operability and performance are shown in terms of inlet starting (pulsed and self-starting) and unstarting characteristics, inlet static pressure distributions, combustor back pressure limits, mass capture, and flow uniformity. Author

A92-48790#

PULSE JET ONE-WAY VALVE PERFORMANCE

JOHN L. LOTH, LEON MONTGOMERY (West Virginia University, Morgantown), and RAVI CHANDRAN (Manufacturing and Technology Conversion International, Inc., Baltimore, MD) SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. Research supported by Manufacturing and Technology Conversion International, Inc. and DOE. refs (AIAA PAPER 92-3169) Copyright

To achieve pulsed combustion compression requires the use of either a mechanical flapper valve, like in the V-1 'buzz bomb', or an aerodynamic one-way valve called a 'rectifier' or 'aerovalve'.

The aerodynamic characteristics of flow separation and or vortex conservation of angular momentum are here used to produce aerovalve diodicity, defined as the steady flow ratio of forward/reverse flow at same delta-P. Several patents on such aerovalves have been filed in the decade following World War II. One of the simplest effective aerovalves is the Kentfield sharp edge throat venturi. During pulse combustion, the time averaged reverse-to-forward flow is calculated to determine the valve leakage. The effects which valve geometry, wave shape, flow choking and temperature ratio have on valve diodicity and leakage are discussed. The time-averaged net forward flow is controlled by the combustor power level. This ratio is used to determine the maximum forward flow rate, which defines the minimum throat area of the aerovalve.

A92-48801#

DESIGN AND TEST OF AN ACTIVE TIP CLEARANCE SYSTEM FOR CENTRIFUGAL COMPRESSORS

M. M. WEIMER (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. (AIAA PAPER 92-3189) Copyright

The Active Tip Clearance System (ATCS) discussed herein meets the industry's needs for a fast-response, active, closed-loop, tip clearance system for both turbines and compressors. The system is based around an electromagnetic actuator which provides variable, flexible clearance control. The ATCS is incorporated into an Allison 250-C30 centrifugal compressor to validate its performance. Results of the testing indicate compressor aerodynamic efficiency improvements of one percent. The ATCS can control tip clearance to within +/- 0.0005 inches over its required range and system response is approximately 100 ms. The system also avoids blade rub during compressor surge by increasing tip clearance prior to surge. Author

A92-48805#

AERO MECHANICS IN THE TWENTY-FIRST CENTURY

THEODORE FECKE (USAF, Wright Laboratory, Wright-Patterson AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p.

(AIAA PAPER 92-3194) Copyright

Recent developments in forced response analysis methods and their application to turbomachinery blades are reviewed. In particular, attention is given to flow defects, unsteady blade loads, and blade response. It is shown that both flow defects and unsteady blade loads can be handled through the use of improved computational fluid dynamics methods. The blade response can be predicted even for composites. It is noted that the major improvement in forced response prediction will be achieved through the integration of computational fluid dynamics and finite element methods.

A92-48832#

THE INFLUENCE OF SPRAY ANGLE ON THE CONTINUOUS-AND DISCRETE-PHASE FLOWFIELD DOWNSTREAM OF AN **ENGINE COMBUSTOR SWIRL CUP**

H. Y. WANG, V. G. MCDONELL, and G. S. SAMUELSEN (California, University, Irvine) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. Research supported by GE Aircraft Engines. refs (AIAA PAPER 92-3231) Copyright

A production gas turbine engine (CFM56) combustor swirl cup assembly, featuring co-axial counter-swirling air streams, was studied at atmospheric pressure and nonreacting conditions. Two simplex atomizers of spray angles 45 and 90 deg were employed with the swirl cup, and the influence of spray angle on the continuous phase (gas phase in the presence of spray) flowfield and droplet dispersion was evaluated by comparing the droplet size, velocity and data rate. A two-component phase Doppler interferometer was used to measure droplet size and velocity, and the continuous-phase velocity. This study reveals that for this flow configuration and liquid loading rate (6 percent) (1) the presence of the swirl cup and swirling air tends to reduce differences in mean droplet size due solely to the different atomizer characteristics, (2) spray angle has little influence on droplet dispersion, and (3) the influence of spray angle on the gas-phase flowfield is negligible.

A92-48855#

PREDICTION OF A HIGH BYPASS RATIO ENGINE EXHAUST NOZZLE FLOWFIELD

R. J. G. NORTON and J. P. KINGSLEY (Rolls-Royce, Inc., Atlanta, GA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs (AIAA PAPER 92-3259) Copyright

A generalized grid generation and flow solver system was developed which can be used to predict the aerodynamic performance of a typical high-bypass-ratio engine exhaust system including the support structures. Cold flow test measurements in the exhaust system were compared with predictions at the engine scale. Excellent agreement between test data and predictions was obtained using a very coarse grid, showing most of the major physical phenomena observed.

A92-48856#

A STUDY ON THE IMPACT OF SHROUD GEOMETRY ON **EJECTOR PUMPING PERFORMANCE**

RONALD J. LUFFY (GE Aircraft Engines, Cincinnati, OH) and A. HAMED (Cincinnati, University, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3260) Copy

Copyright

Current understanding of convergent-divergent ejector nozzles enables thrust augmentation predictions for certain configurations, but the effect of ejector shroud geometry on the ejector secondary flow rates has not been investigated. The present study was conducted to experimentally investigate the effect of the shroud geometry near the ejector slot on the secondary flow. Two geometric parameters were varied in the rectangular, single throat slot test ejector. Secondary flow and pressure distribution measurement for the different geometries are presented. The results indicate that the nozzle geometry near the ejector slot significantly affects the ejector's secondary flow pumping characteristics.

A92-48858*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

COMPARATIVE INVESTIGATION OF MULTIPLANE THRUST **VECTORING NOZZLES**

F. CAPONE (NASA, Langley Research Center, Hampton, VA), P. SMERECZNIAK, D. SPETNAGEL (McDonnell Aircraft Co., Saint Louis, MO), and E. THAYER (Pratt & Whitney Group, West Palm AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 14 p. refs

(AIAA PAPER 92-3263)

The inflight aerodynamic performance of multiplane vectoring nozzles is critical to development of advanced aircraft and flight control systems utilizing thrust vectoring. To investigate vectoring nozzle performance, subscale models of two second-generation thrust vectoring nozzle concepts currently under development for advanced fighters were integrated into an axisymmetric test pod. Installed drag and vectoring performance characteristics of both concepts were experimentally determined in wind tunnel testing. CFD analyses were conducted to understand the impact of internal flow turning on thrust vectoring characteristics. Both nozzles exhibited drag comparable with current nonvectoring axisymmetric nozzles. During vectored-thrust operations, forces produced by external flow effects amounted to about 25 percent of the total force measured. Author

A92-48859#

SCALE MODEL TEST RESULTS OF A MULTI-SLOTTED **VECTORING 2DCD EJECTOR NOZZLE**

J. G. DOONAN and A. P. KUCHAR (GE Aircraft Engines, Cincinnati,

OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3264) Copyright

The performance and air-handling characteristics of a multislotted advanced two-dimensional convergent-divergent (2DCD) vectoring ejector nozzle were evaluated using scale model cold flow static tests. The ejector exhaust system concept incorporated four ejector cooling slots on each of the upper and lower secondary flaps, and a unique secondary flow control system was used to allow independent throttling and metering of the flow to each of the eight ejector slots. The air-handling characteristics were determined for the unvectored and vectored 2DCD ejector nozzle configurations. It was found that, in general, minimal degradation of the overall air-handling capability took place for the vectored configurations. However, for certain operating conditions, the upstream ejector slots experienced a tendency to backflow.

A92-48878#

A SCRAMJET NOZZLE EXPERIMENT WITH HYPERSONIC **EXTERNAL FLOW**

SHIGEYA WATANABE (National Aerospace Laboratory, Chofu, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3289) Copyright

The effect of the interaction of an engine exhaust with a hypersonic external flow on the performance of a scramjet nozzle was investigated in tests carried out in the NAL hypersonic wind tunnel with freestream Mach number of 7.1, whose freestream constitutes the external flow. Room-temperature air was used as the simulated engine exhaust flow. Model surface pressure and Pitot pressure distributions in the flowfields were measured, and flow visualization was performed using several techniques. It was found that the external flow restrains the outward expansion of the exhaust and delays the boundary layer separation on the ramp side regions and near the ramp aft end. The spanwise expansion of the exhaust flow can be greatly restrained by using long side fences.

A92-48879#

EXPERIMENTAL VALIDATION OF SCRAMJET NOZZLE **PERFORMANCE**

TOHRU MITANI, KOICHIRO TANI, SHIGERU SATO, HIROSHI MIYAJIMA (National Aerospace Laboratory, Kakuda, Japan), MATSUMOTO, MASASHI and SHOUHACHI (Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs

(AIAA PAPER 92-3290) Copyright
Thrust by scramjet nozzles was measured using high temperature gas flow with a Mach No. of 2.5 and a total temperature of 3100 K produced by combustion of monomethyl hydrazine (MMH) and nitrogen tetraoxide (NTO). Wall pressure on the nozzles was monitored at more than 150 points to estimate the pressure force on the nozzles. In order to validate experimental technique and numerical codes, a series of cold nitrogen (N2) flow tests was also conducted using the same nozzle. An inviscid two-dimensional kinetic code was able to reproduce nozzle performance of cold N2 flow within a discrepancy of 6.6 percent. The calculation also agreed with the experimental results of hot MMH/NTO flow within an error of 3.6 percent, if the energy release loss in the gas generator. Kinetic, two-dimensional and friction losses in scram nozzles were identified for the nozzle, and effects of scale on performance on a scramjet nozzle for H2-fuel engines are discussed.

A92-48904#

A SIMPLIFIED REAL-TIME ENGINE MODEL FOR DEVELOPING AEROENGINE CONTROL SYSTEM

SHAOJI ZHANG (Shenyang Aeroengine Research Institute, AIAA, SAE, ASME, and ASEE, People's Republic of China) Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 6 p. refs

(AIAA PAPER 92-3321) Copyright

Based on a detailed nonlinear engine model, a simplified transient mathematical aeroengine model is developed for use in real-time simulations for developing engine control systems. The model is shown to be accurate to within 3 percent, flexible enough for use with different engines, and convenient for programming in C and FORTRAN. Simultation results are presented for a two-spool turbojet engine.

A92-48911#

SPECIFYING EXHAUST NOZZLE CONTOURS IN REAL-TIME USING GENETIC ALGORITHM TRAINED NEURAL NETWORKS KEVIN W. WHITAKER, RAVI K. PRASANTH, and ROBERT E. MARKIN (Alabama, University, Tuscaloosa) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3328) Copyright

The objective of the study was to investigate the possibility of using genetic algorithms to train a neural network to design, in real-time, thrust vectoring nozzle contours. It is demonstrated that this approach provides a viable real-time alternative for designing thrust vectoring nozzle contours. Thrust vectors up to 20 deg have been obtained with an average error of 0.0914 deg. The robustness of the genetic algorithms is shown to be well suited for minimizing global errors.

A92-48940*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

HIGH SPEED ROTORCRAFT PROPULSION CONCEPTS TO CONTROL POWER/SPEED CHARACTERISTICS

J. L. BETTNER, J. M. HAWKINS, and C. S. BLANDFORD (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 21 p. Research supported by NASA. refs

(AIAA PAPER 92-3367) Copyright

Recent NASA sponsored rotorcraft airframer studies have demonstrated the desire for constant power over a wide range of output speed for turboshaft propulsion systems. This study interrogated several different concepts aimed at maintaining constant power over a speed variation from 100-50 percent with minimum increase in fuel consumption. The baseline engine was an advanced technology 8000 shp, fixed turbine geometry, turboshaft engine. The concepts investigated included variable geometry turbines, variable geometry compressors, power transfer from the HP to LP shafts, counterrotating power turbine with a combiner gearbox, and variable speed transmission integrated with the baseline turboshaft engine. The concept that best satisfies the program objectives with superior engine performance and with the least technical risk is the baseline (fixed geometry turbines) turboshaft engine integrated with the variable speed transmission.

A92-48979#

FAILURE MODEL DEVELOPMENT FOR AN INTEGRALLY BLADED TURBINE WHEEL

ROBERT G. TRYON and THOMAS A. CRUSE (Vanderbilt University, Nashville, TN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs

(AIAA PAPER 92-3420) Copyright

The application of probabilistic structural analysis methods to the low-cycle fatigue life of an integrally bladed high-pressure turbine wheel is described. The variation in the primary and secondary flow parameters, the uncertainty of the complex mission loading, and the scatter in the material data are considered. The analysis incorporates standard modeling techniques currently used in the deterministic analysis of the low-cycle fatigue life. A risk management capability is developed using Monte Carlo simulation and computationally efficient closed form solutions of the engine modes.

A92-48984*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

ANALYSIS OF A HYDROCARBON SCRAMJET WITH AUGMENTED PREBURNING

GREGORY A. MOLVIK, JEFFREY V. BOWLES, and LOC C. HUYNH (NASA, Ames Research Center, Moffett Field, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 16 p. refs (Contract NCC2-498; NCC2-746)

(AIAA PAPER 92-3425) Copyright

This paper presents the results of a feasibility study of a hydrocarbon scramjet design utilizing an augmented preburner upstream of the main fuel injector locations. The combustor design evaluated here is for a small hypersonic research vehicle. It consists of a preburner into which a small amount of fuel is burned with on-board liquid oxygen and injected into the main airflow, upstream of the main fuel injector locations, thus ensuring that combustion is present and uninterrupted. Two degrees of analysis are presented including a one-dimensional cycle analysis and a complete computational fluid dynamic analysis with finite-rate chemistry and a two-equation turbulence model. Comparison of these analyses show good agreement when the CFD-predicted fuel consumption schedule is used in the cycle analysis.

A92-49014#

A DISTRIBUTED VAPORIZATION TIME-LAG MODEL FOR GAS TURBINE COMBUSTOR DYNAMICS

JAYESH M. MEHTA, P. MUNGUR, W. DODDS (GE Aircraft Engines, Cincinnati, OH), and L. DODGE (Southwest Research Institute, San Antonio, TX) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 14 p. refs

(AIAA PAPER 92-3465) Copyright

A linear combustion instability prediction code incorporating fuel vaporization effects has been developed and exercised to predict/interpret the acoustic behavior of the combustor. The paper first describes an enhanced thermoacoustic model featuring a fuel vaporization physical submodel. It is followed by numerical experiments which describe fuel vaporization effects on combustion instability. The numerical experiments replicate some of the observed engine operating experiences such as: the use of more volatile fuel reduces howl amplitude; altering fuel nozzles alters the howl characteristics; and increased combustor inlet temperature results in reduced howl.

A92-49019#

NAVAL AIRCRAFT/ENGINE MISSION PAYOFF ANALYSES

JOSEPH DEMARTINO (U.S. Navy, Naval Air Warfare Center, Trenton, NJ) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 5 p. refs

(AIAA PAPER 92-3473)

A 'quick-look' method has been developed which illustrates advancements in powerplant performance obtained through efforts associated with the Integrated High Performance Turbine Engine Technology program in terms of a specific aircraft's mission-capabilities improvement. Attention is given to the cases of the F/A-18 and P-3 aircraft: where (1) there has been a percentage increase in thrust/weight due to improved materials, component efficiencies, pressure ratios, combustion temperatures, and airflows; and (2) the total amount of fuel required for a mission with the improved engines is calculated and compared with that typical of the existing powerplants.

A92-49020#

TURBOSHAFT/TURBOPROP CYCLE SENSITIVITY ANALYSIS

JAMES D. PELUSO (U.S. Navy, Naval Air Warfare Center, Trenton, NJ) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs (AIAA PAPER 92-3476)

An analysis of turboshaft/turboprop engine systems was conducted to determine the sensitivities of specific fuel consumption (SFC) and power to weight ratio (SHP/WT) to

variations in engine component performance. Cycle pressure ratio and component efficiencies were found to be the most influential parameters on SFC. SHP/WT was most significantly affected by variations in turbine inlet temperature. It was found that system performance sensitivity of large engines is less than that of small engines. Also, system performance was found to become less sensitive to changes in component performance with increasing levels of technology.

A92-49021#

ENGINE FAN BLADE LOW CYCLE FATIGUE TESTING

DY D. LE (U.S. Navy, Naval Air Warfare Center, Trenton, NJ) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs (AIAA PAPER 92-3478)

Spin testing of high-bypass turbofan engine fan blades discovered that disk bushings at the blade attachment location frequently backed out during operation causing a deep groove to wear into the attachment tang of the blade. Their movement was the result of insufficient interference fit between the fan disk and bushing. Finite element analysis and microscopic examination of the fan blade fracture surface show that the wear groove acts as a stress riser and the site for crack initiation and propagation. Weibull analysis shows that the wear groove significantly reduces the jet engine fan blade LCF life.

A92-49023#

DESIGN ISSUES IN A FIBER OPTIC SENSOR SYSTEM ARCHITECTURE FOR AIRCRAFT ENGINE CONTROL

SAMHITA DASGUPTA (GE Aircraft Engines, Cincinnati, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3483) Copyright

Advanced aircraft propulsion systems must meet increasingly challenging performance requirements and endure more rigorous thermal environmental constraints. The use of fiber optic technology provides extended environmental and performance capability, electromagnetic immunity without weight penalties, and also provides high speed data transmission capability. A number of design issues in a fiber optic control system such as overall size of the electrooptics, the update rate, and accuracy were investigated. An approach to the design of a size and update rate optimized fiber optic architecture for a set of engine control sensors is presented. The proposed architecture utilizes a set of spectral modulation sensors which are interfaced to a common light source, and a detector set for each sensor. The detection circuitry can be integrated on the same substrate. The sensor set includes pressure, temperature, position and speed sensors.

A92-49024#

INTELLIGENT ENGINE CONTROL (IEC)

SHRIDER ADIBHATLA, HAROLD BROWN (GE Aircraft Engines, Cincinnati, OH), and ZANE GASTINEAU (USAF, Wright Laboratory, Wright-Patterson AFB, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs

(AIAA PAPER 92-3484) Copyright

Intelligent Engine Control (IEC) is a program aimed at the assessment, design, and evaluation of advanced model based control modes to quantify their effect on engine performance, operability and survivability. IEC addresses the Integrated, High Performance Turbine Engine Technology goal of increasing engine thrust-to-weight ratio by reducing weight and enhancing performance. Unlike current engine controls, IEC provides a control concept with a variety of control modes available at each operating conditions that the optimal mode can be selected for the current system role and operating condition. The IEC concept includes unique control modes for emphasizing engine performance, operability, low observability, reduced redundancy, and others. This paper presents the IEC concept and describes a methodology for the evaluation of control mode. Results of a preliminary evaluation of the special operating modes defined under the IEC program are also presented.

A92-49098#

THE EXTERNAL PROPULSION ACCELERATOR - SCRAMJET THRUST WITHOUT INTERACTION WITH ACCELERATOR BARREL

JOSEF ROM and GAVRIEL AVITAL (Technion - Israel Institute of Technology, Haifa) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by Technion - Israel Institute of Technology and Asher Peled Memorial Fund. refs

(AIAA PAPER 92-3717) Copyright The performance characteristics of the External Propulsion Accelerator are evaluated using the simplified planar oblique shock wave and oblique detonation wave analysis. In this Accelerator the projectile flies in the premixed fuel/oxidizer mixture, its flowfield is dominated by the interaction between the shock wave generated at the nose of the projectile and the detonation wave generated by a blunt step on the shoulder of the projectile. Thrust is obtained by translating the energy of the high pressure high temperature gases, trapped behind the detonation wave and the contact surface (generated at the intersection of the waves), by expansion on the contracting rear section of the projectile. The characteristics of the flow at the intersection of the shock and detonation waves and the rear expansion are studied using polar diagrams. The pressure distribution on the projectile is calculated in this analysis. The thrust generated on the projectile, as a function of the various flow parameters, can be evaluated. It is found that for reasonable values of heat addition in the detonation process a sizable thrust can be generated.

A92-49110*# National Aeronautics and Space Administration.
Hugh L. Dryden Flight Research Facility, Edwards, CA.

SUBSONIC FLIGHT TEST EVALUATION OF A PROPULSION SYSTEM PARAMETER ESTIMATION PROCESS FOR THE F100 ENGINE

JOHN S. ORME and GLENN B. GILYARD (NASA, Flight Research Center, Edwards, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 25 p. refs

(AIAA PAPER 92-3745) Copyright

An adaptive-performance-seeking control system which optimizes the quasi-steady-state performance of the F-15 propulsion system is discussed. This paper presents flight- and ground-test evaluations of the propulsion system parameter-estimation process used by the performance seeking control system. The estimator consists of a compact propulsion system model and an extended Kalman filter. The extended Kalman filter estimates five engine component deviation parameters from measured inputs. The compact model uses measurements and Kalman-filter estimates as inputs to predict unmeasured propulsion parameters such as net propulsive force and fan stall margin. The ability to track trends and estimate absolute values of propulsion system parameters was demonstrated. For example, thrust stand results show a good correlation especially in trends between the performance seeking control estimated and measured thrust. Author

A92-49111*# National Aeronautics and Space Administration.
Hugh L. Dryden Flight Research Facility, Edwards, CA.

THRUST STAND EVALUATION OF ENGINE PERFORMANCE IMPROVEMENT ALGORITHMS IN AN F-15 AIRPLANE

TIMOTHY R. CONNERS (NASA, Flight Research Center, Edwards, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 21 p. refs (AIAA PAPER 92-3747) Copyright

Results are presented from the evaluation of the performance seeking control (PSC) optimization algorithm developed by Smith et al. (1990) for F-15 aircraft, which optimizes the quasi-steady-state performance of an F100 derivative turbofan engine for several modes of operation. The PSC algorithm uses onboard software engine model that calculates thrust, stall margin, and other unmeasured variables for use in the optimization. Comparisons are presented between the load cell measurements, PSC onboard model thrust calculations, and posttest state variable model

computations. Actual performance improvements using the PSC algorithm are presented for its various modes. The results of using PSC algorithm are compared with similar test case results using the HIDEC algorithm.

A92-49112#

ANALYTICAL DESIGN AND DEMONSTRATION OF A LOW-COST EXPENDABLE TURBINE ENGINE COMBUSTOR

TIMOTHY C. ROESLER, HUKAM C. MONGIA, and HAROLD L. STOCKER (General Motors Corp., Indianapolis, IN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs (AIAA PAPER 92-3754) Copyright

A low-cost 500-lb thrust class combustion system was designed using advanced analytical techniques and was demonstrated to operate successfully without development testing. Empirical methods were used to establish the overall geometry and stoichiometry of the combustion system, and a 3D finite difference reacting flow model was used to refine the design. The 3D code solved the Navier-Stokes equations for a reacting flow field, simulated turbulence using a k-epsilon model, and used a four-step chemical reaction scheme based on the Arrhenius and eddy break-up concepts. The resulting design is shown to meet or exceed all design goals, demonstrating that the use of advanced analytical techniques in the development of new combustion systems yielded significant payoffs, including reduced schedule and development time and reduced risk.

A92-49113#

GENERATORS INSIDE SMALL ENGINES

NORMAN GOLDBERG (Pacific Scientific, Santa Barbara, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. (AIAA PAPER 92-3755) Copyright

While currently most generators rely on an engine gearbox for their power, reliability would be gained from generators' direct driving from the engine shaft; this is especially advantageous in the case of full-authority digital electronic control systems. An account is presently given of the design features and performance characteristics of weight- and space-efficient permanent magnet generators for such engine-driveshaft installations. Recommendations are made for volume apportionments during engine preliminary

A92-49114#

EMERGING TECHNOLOGIES FOR GAS TURBINE ENGINES -U.A.V. SYNERGIES

S. P. DEV (Textron Lycoming, Seymour, CT) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3757) Copyright

An evaluation is made of the applicability of emerging gas turbine advanced technologies to unmanned air vehicles (UAVs), as a means of both enhancing UAV performance and increasing the level of confidence in the technologies in question before their use in manned vehicles. The technologies considered encompass metal and ceramic matrix composites, ultrahigh speed alternators, ceramic bearings, and solid lubricants. Attention is given to the synergies implicit in the new technologies' application to UAVs, in virtue of their miniaturization-related advantages.

THE NUMERICAL SIMULATION OF THE MAIN FUEL CONTROL UNIT OF GAS TURBINE ENGINES

GIOVANNI TORELLA (Italian Air Force Academy, Naples, Italy) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3760) Copyright

A numerical simulation of the main fuel control unit (MFCU) of a gas turbine engine was performed to evaluate the influence of MFCU on the performance and the behavior of the gas turbine engine. Both steady and unsteady engine operations were considered. It is demonstrated that the numerical codes may be used for simulating the MFCU operation and for evaluating control laws necessary for obtaining assigned performance laws.

A92-49119#

CONCEPTUAL STUDY OF SEPARATED CORE ULTRA HIGH **BYPASS ENGINE** Y. SAITO, M. ENDOH, N. SUGAHARA, and K. YAMAMOTO

(National Aerospace Laboratory, Chofu, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. Research supported by Ishikawajima-Harima Heavy Industries, Ltd., Kawasaki Heavy Industries, Ltd., and Fuji Heavy Industries, Ltd.

(AIAA PAPER 92-3775) Copyright

An application-evaluation study is presented for a novel, 'separated-core' engine configuration for aircraft propulsion in which a turbojet primary or 'core' powerplant furnishes compressed air via pneumatic duct to remotely located secondary propulsors such as an ultrahigh-bypass fan, which are turned by burning fuel in a dedicated combustor/turbine system via reduction gearbox. Attention is fiven to the case of a VTOL transport concept whose secondary propulsors encompass both a pair of cruise-flight turbofans and a set of six vertical-thrust lift-fans; a battery of three core turbojets is used to supply the requisite compressed air to all secondary units.

A92-49120#

DESIGN AND OFF-DESIGN POINT CHARACTERISTICS OF SEPARATED CORE ULTRA HIGH BYPASS ENGINE (SCUBE)

YUKIO MATSUDA, NANAHISA SUGIYAMA, YOSHIO SAITO, and MASANORI ENDOH (National Aerospace Laboratory, Chofu, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs (AIAA PAPER 92-3776) Copyright

Separated Core Ultrahigh Bypass Engine (SCUBE) is an innovative propulsion system suited for subsonic aircraft, especially for VTOL aircraft, and has many advantageous characteristics compared to conventional engines. This paper describes the design- and off-design-point characteristics of SCUBE. SCUBE consists of two units, core engine and fan engine. Performance of core engine and fan engine are investigated under several conditions, and preferable core and fan engines for SCUBE may be defined. Assuming an aircraft with (weight) = 40,000 kg, (lift/drag) = 10 and required cruise thrust = 39.2 kN, design and off-design point characteristics of SCUBE, including transient performance, are described. Even though using engine component data based on the current technology level, the performance of SCUBE is advantageous compared to that of conventional turbofan engines, and no defect exists to realize SCUBE from the viewpoint of performance.

A92-49128*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ANALYTICAL AND EXPERIMENTAL STUDIES OF HEAT PIPE RADIATION COOLING OF HYPERSONIC PROPULSION **SYSTEMS**

R. A. MARTIN, M. A. MERRIGAN, M. G. ELDER, J. T. SENA, E. S. KEDDY (Los Alamos National Laboratory, NM), and C. C. SILVERSTEIN (CCS Associates, Bethel Park, PA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. Research sponsored by DOE.

(Contract NASA ORDER C-30002-M) (AIAA PAPER 92-3809)

Analytical and experimental studies were completed to assess the feasibility of using high-temperature heat pipes to cool hypersonic engine components. This new approach involves using heat pipes to transport heat away from the combustor, nozzle, or inlet regions, and to reject it to the environment by thermal radiation from an external heat pipe nacelle. For propulsion systems using heat pipe radiation cooling (HPRC), it is possible to continue to use hydrocarbon fuels into the Mach 4 to Mach 6 speed range, thereby enhancing the economic attractiveness of commercial or

military hypersonic flight. In the second-phase feasibility program recently completed, it is found that heat loads produced by considering both convection and radiation heat transfer from the combustion gas can be handled with HPRC design modifications. The application of thermal insulation to ramburner and nozzle walls was also found to reduce the heat load by about one-half and to reduce peak HPRC system temperatures to below 2700 F. In addition, the operation of HPRC at cruise conditions of around Mach 4.5 and at an altitude of 90,000 ft lowers the peak hot-section temperatures to around 2800 F. An HPRC heat pipe was successfully fabricated and tested at Mach 5 conditions of heat flux, heat load, and temperature.

A92-49139#

COMPENSATING FOR MANUFACTURING AND LIFE-CYCLE VARIATIONS IN AIRCRAFT ENGINE CONTROL SYSTEMS

R. RAVI, K. D. MINTO (GE Control Systems Laboratory, Schenectady, NY), M. GRAFTON, and I. BANSAI (GE Aircraft Engines, Cincinnati, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs

(AIAA PAPER 92-3869) Copyright

The objective is to develop a methodology for designing robust controllers for aircraft engines. Typically, information about engine-to-engine variations due to manufacturing tolerances and time degradation is represented by key parameters in the engine model. These parameters are statistically varied to generate a number of perturbed models from the baseline nonlinear model. This set of perturbed models into the standard norm bounded additive uncertainty form so that existing software can be used to design the controller. In the process, a way was proposed of determining a nominal model which is needed in the design process. The results show that, using these modeling techniques along with modern robust design algorithms like mu synthesis, yield controllers that deliver superior performance as compared to existing classical controllers. While these results pertain mainly to aircraft engine control, the techniques elucidated here carry over to problems where the plant to be controlled is stable and the uncertainty information is available in a similar form.

N92-28294# Southwest Research Inst., San Antonio, TX. Engine Fuel and Vehicle Research Div.

HIGH-TEMPERATURE MINIATURIZED TURBINE ENGINE LUBRICATION SYSTEM SIMULATOR Final Report, Sep. 1988 - May 1991

CLIFFORD A. MOSES, PIERRE J. GUTIERREZ, BURL B. BABER, and JOHN P. CUELLAR Feb. 1992 50 p (Contract F33615-88-C-2816)

(AD-A249259; WL-TR-91-2103) Avail: CASI HC A03/MF A01

A high-temperature miniaturized turbine engine lubrication system simulator was designed and fabricated for the purpose of evaluating limited quantities, 1 quart or less, of candidate Integrated High Performance Turbine Engine Technology candidate lubricants. The computer-controlled simulator can determine a lubricant's functional and tribological properties under a wide variety of operating conditions. Metal test coupons can be added to the system to evaluate a lubricant's corrosive properties. Operating parameters are 10,000 rpm, 100 Ksi Hertz stress bulk oil temperatures to 750 F, bearing temperatures to 8500 F, and hot spots to 9500 F. The simulator also has the capability for inert atmosphere and once through lubrication operation. Validation of the simulator was accomplished with 48-hour test runs using high temperature polyester and polyphenylether lubricants.

N92-28418*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

INTERNAL REVERSING FLOW IN A TAILPIPE OFFTAKE CONFIGURATION FOR SSTOVL AIRCRAFT

JACK G. MCARDLE, BARBARA S. ESKER, and JAMES A. RHODES (McDonnell Aircraft Co., Saint Louis, MO.) Jul. 1992 23 p Proposed for presentation at the 28th Joint Propulsion Conference and Exhibit, Nashville, TN, 6-8 Jul. 1992; sponsored by AIAA, SAE, ASME, and ASEE

(Contract RTOP 505-68-32) (NASA-TM-105698; E-7086; NAS 1.15:105698; AIAA PAPER 92-3790) Avail: CASI HC A03/MF A01

A generic one-third scale model of a tailpipe offtake system for a supersonic short takeoff vertical landing (SSTOVL) aircraft was tested at LeRC Powered Lift Facility. The model consisted of a tailpipe with twin elbows, offtake ducts, and flow control nozzles, plus a small ventral nozzle and a blind flange to simulate a blocked cruise nozzle. The offtake flow turned through a total angle of 177 degrees relative to the tailpipe inlet axis. The flow split was 45 percent to each offtake and 10 percent to the ventral nozzle. The main test objective was to collect data for comparison to the performance of the same configuration predicted by a computational fluid dynamics (CFD) analysis. Only the experimental results are given - the analytical results are published in a separate paper. Performance tests were made with unheated air at tailpipe-to-ambient pressure ratios up to 5. The total pressure loss through the offtakes was as high as 15.5 percent. All test results are shown as graphs, contour plots, and wall pressure distributions. The complex flow patterns in the tailpipe and elbows at the offtake openings are described with traversing flow angle probe and paint streak flow visualization data.

N92-28419*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

FULL NAVIER-STOKES ANALYSIS OF A TWO-DIMENSIONAL MIXER/EJECTOR NOZZLE FOR NOISE SUPPRESSION

JAMES R. DEBONIS Jul. 1992 17 p Proposed for presentation at the 28th Joint Propulsion Conference and Exhibit, Nashville, TN, 6-8 Jul. 1992; sponsored by AIAA, SAE, ASME, and ASEE (Contract RTOP 537-02-23)

(NASA-TM-105715; E-7109; NAS 1.15:105715; AIAA PAPER 92-3570) Avail: CASI HC A03/MF A01

A three-dimensional full Navier-Stokes (FNS) analysis was performed on a mixer/ejector nozzle designed to reduce the jet noise created at takeoff by a future supersonic transport. The PARC3D computational fluid dynamics (CFD) code was used to study the flow field of the nozzle. The grid that was used in the analysis consisted of approximately 900,000 node points contained in eight grid blocks. Two nozzle configurations were studied: a constant area mixing section and a diverging mixing section. Data are presented for predictions of pressure, velocity, and total temperature distributions and for evaluations of internal performance and mixing effectiveness. The analysis provided good insight into the behavior of the flow.

N92-28458# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Propulsion and Energetics Panel.

STEADY AND TRANSIENT PERFORMANCE PREDICTION OF GAS TURBINE ENGINES [PREDICTION DES PERFORMANCES DES MOTEURS A TURBINE A GAZ EN REGIMES ETABLI ET TRANSITOIRE]

May 1992 189 p Lectures held in Cambridge, MA, 27-28 May 1992, in Neubiberg, Fed. Republic of Germany, 9-10 Jun. 1992, and in Chatillon/Bagneux, France, 11-12 Jun. 1992 (AGARD-LS-183; ISBN-92-835-0674-X) Copyright Avail: CASI HC A09/MF A02

Aero-thermodynamic performance prediction methods for gas turbine engines with respect to steady and transient operation are discussed. This includes advanced cycle calculation methods, also taking into account variable cycle engine types. A very important objective is the consideration of installation effects, i.e. Reynolds number and inlet distortions, as well as advanced control concepts for increasing engine surge margins. In addition to these topics, individual papers include practical considerations in designing the engine cycle, dynamic simulation, inlet distortion effects in aircraft propulsion system integration, 'smart' engines, and performance and health monitoring models.

N92-28459# Carleton Univ., Ottawa (Ontario). Dept. of Mechanical and Aerospace Engineering.

OVERVIEW ON BASIS AND USE OF PERFORMANCE PREDICTION METHODS

H. I. H. SARAVANAMUTTOO In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 18 p May 1992

Copyright Avail: CASI HC A03/MF A02

The basic methods of component matching, which is central to the prediction of gas turbine performance, are outlined. Steady-state prediction of off-design performance must be done at the beginning of an engine development program. This ensures that the engine can satisfy all the mission requirements. The matching techniques can be extended to predict transient performance, which is essential for controls development and to ensure good engine handling. The large amount of computation required demands the use of computer modelling and the role of modelling in the development program and the basic requirements for performance modelling are described.

N92-28460# Royal Aerospace Establishment, Farnborough (England). Air Vehicle Performance Dept.

PRACTICAL CONSIDERATIONS IN DESIGNING THE ENGINE CYCLE

M. G. PHILPOT In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 24 p May 1992 Sponsored by Ministry of Defence

Copyright Avail: CASI HC A03/MF A02

To define the cycle parameters and calculate the performance of a real engine, numerous practical constraints need to be taken into account. These fall into two main categories: the limitations of available component technologies; and the operational considerations that are dependent on aircraft application. The main technology limiters are discussed. How they are incorporated into the cycle definition process is indicated. Operational factors include the extent of the intended flight envelope and the range of the critical flight conditions for which performance must be assured, and the balance to be struck between minimizing fuel consumption, maximizing installed power, and constraining costs of ownership. Taking these technology and operational influences into account, the basic cycle characteristics and approach to cycle choice are examined for three main classes of aircraft: subsonic transports, military combat aircraft, and helicopters.

N92-28461# Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Moissy-Cramayel (France). Engineering Div. STEADY AND TRANSIENT PERFORMANCE CALCULATION METHOD FOR PREDICTION, ANALYSIS, AND IDENTIFICATION

JEAN PIERRE DUPONCHEL, JEAN LOISY, and RENE CARRILLO In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 21 p \ May 1992 Copyright Avail: CASI HC A03/MF A02

The detailed design and development of turbofans involves the prediction and identification, by means of test analysis, of the performance of the engine and its components. The thermodynamic simulation and analysis codes integrate existing knowledge and interpretations of the detailed operating procedure of the components of the engine being developed. The relevance of the predicted performance depends on the quality of the representation of the various physical phenomena affecting the characteristics of the components and, consequently, on the incorporation of experimental correlation in the modelling. In this context, the representation of compressor and turbine characteristics is particularly important. We will analyze the ability of corrected parameters to represent MACH similitude at the component inlet under various conditions.

N92-28462# Carleton Univ., Ottawa (Ontario). Dept. of Mechanical and Aerospace Engineering.

COMPONENT PERFORMANCE REQUIREMENTS

H. I. H. SARAVANAMUTTOO In AGARD, Steady and Transient

Performance Prediction of Gas Turbine Engines 10 p May 1992

Copyright Avail: CASI HC A02/MF A02

Component data are essential for modelling the overall performance of gas turbines. The component characteristics are not easily obtained, and much of the data are proprietary and not available in the open literature. Several methods are available for estimating component characteristics and are briefly described. The requirements of users and manufacturers are quite different, but both can produce fully credible performance models. Author

N92-28463# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.

DYNAMIC SIMULATION OF COMPRESSOR AND GAS TURBINE PERFORMANCE

WALTER F. OBRIEN *In* AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 28 p May 1992

Copyright Avail: CASI HC A03/MF A02

Dynamic performance simulation models are discussed with emphasis on the fundamental principles of the models and the methods used to represent component and stage flow characteristics. Results of several simulations of the dynamic behavior of multistage compressors are shown with comparisons to experimental data. Possibilities for advanced computational techniques for near-real-time simulations of compressors and gas turbines are reviewed.

N92-28464*# Cambridge Univ. (England).
INLET DISTORTION EFFECTS IN AIRCRAFT PROPULSION
SYSTEM INTEGRATION

J. P. LONGLEY (Cambridge Univ. (England).) and E. M. GREITZER (Massachusetts Inst. of Tech., Cambridge.) In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 18 p May 1992 Sponsored by NASA. Lewis Research Center; GE; and Rolls-Royce Ltd.

Copyright Avail: CASI HC A03/MF A02

A tutorial survey of inlet flow distortion effects on engine performance and stability is presented. Inlet distortions in aero engines arise through a variety of causes. They can be essentially steady, due to non-axisymmetric intake duct geometry, or time varying, for example from flow separation off the lip of the inlet during maneuvers or shock-induced separation during supersonic flight. Whatever the cause, the result is generally a decrease in performance and, more importantly, a lessening of the stable flow range of the compressor. The distortions are generally three-dimensional. It is an extremely useful simplification to break them, at least conceptually, into radial and circumferential non-uniformities and approach each separately. Purely radial distortions can be treated by the methods that were developed for designing compressors in nominally axisymmetric inlet flow, and this type of distortion will be only briefly discussed. Circumferential non-uniformities, however, introduce additional fluid dynamic features into the analysis of compressor behavior and often have the larger impact on performance and stability. Thus we concentrate mainly on the effects of steady circumferential inlet flow distortion.

N92-28465# Technische Univ., Munich (Germany, F.R.). Performance Dept.

CALCULATION OF INSTALLATION EFFECTS WITHIN PERFORMANCE COMPUTER PROGRAMS

J. KURZKE *In* AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 19 p May 1992
Copyright Avail: CASI HC A03/MF A02

Gas turbine engine components, such as compressors, burners, and turbines are usually tested on rigs prior to installation into an engine. In the engine, the component behavior is different for a variety of reasons. The installation effects are caused by small geometrical differences due to nonrepresentative rig operating temperatures and pressures, by different gas properties and Reynolds numbers and by radial as well as circumferential temperature and pressure profiles at the inlet to the component.

For highly accurate performance predictions these rig-to-engine effects are taken into account. Traditionally the term 'installation' is also used for describing all the differences in engine operation and behavior between testbed and aircraft. Intake and afterbody drag, power offtake and bleed, as well as intake pressure losses and inlet flow distortion have significant impact on airflow, thrust, specific fuel consumption, and compressor stability. Using modern performance synthesis programs all these effects can be simulated.

N92-28466*# Massachusetts Inst. of Tech., Cambridge. Gas Turbine Lab.

DYNAMIC CONTROL OF AERODYNAMIC INSTABILITIES IN GAS TURBINE ENGINES

E. M. GREITZER, A. H. EPSTEIN, G. R. GUENETTE, D. L. GYSLING, J. HAYNES, G. J. HENDRICKS, J. PADUANO, J. S. SIMON, and L. VALAVANI In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 20 p May 1992 Sponsored by NASA. Lewis Research Center; AFOSR; ONR; Pratt and Whitney Aircraft; and Army Aviation Systems Command

Copyright Avail: CASI HC A03/MF A02

This lecture discusses the use of closed loop control at the component level to enhance the performance of gas turbine engines. The general theme is the suppression of flow instabilities (rotating stall and surge) through use of feedback, either actively or by means of the aeromechanical coupling provided by tailored structures. The basic concepts that underlie active control of turbomachinery instability, and their experimental demonstration, are first described for a centrifugal compressor. It is shown that the mechanism for stabilization is associated with damping of unsteady perturbations in the compression system, and the steady-state performance can thus remain virtually unaltered. Control of instability using a tailored structure is then discussed, along with experimental results illustrating the flow range extension achievable using this technique. A considerably more complex problem is presented by active control or rotating stall where the multi-dimensional features mean that distributed sensing and actuation are required. In addition, there are basic questions concerning unsteady fluid mechanics; these imply the need to resolve issues connected with identification of suitable signals as well as with definition of appropriate wave launchers for implementing the feedback. These issues are discussed and the results of initial successful demonstrations of active control of rotating stall in a single-stage and a three-stage axial compressor are presented. The lecture concludes with suggestions for future research on dynamic control of gas turbine engines. Author

N92-28467# GasTOPS Ltd., Gloucester (Ontario). ENGINE PERFORMANCE AND HEALTH MONITORING MODELS USING STEADY STATE AND TRANSIENT PREDICTION METHODS

B. D. MACISAAC In AGARD, Steady and Transient Performance Prediction of Gas Turbine Engines 21 p May 1992 Copyright Avail: CASI HC A03/MF A02

The role of computer modelling in the design, development, and validation of a performance monitoring system is discussed. The basic requirements of an engine health monitoring system are discussed in the context of the user environment. A form of model based on stage characteristics provides the basis for describing engine measurements. Faults are modelled in accordance with empirical data obtained from tests conducted at the stage level. The model is used to investigate various parameters that provide unambiguous identification of the fault in question. Fault libraries were developed for field use.

N92-28686# Science Applications International Corp., San Antonio, TX. Logistics Technology Div.
TURBINE AIRCRAFT ENGINE OPERATIONAL TRENDING AND JT8D STATIC COMPONENT RELIABILITY STUDY Final Report, 28 Mar. 1990 - 28 Mar. 1991

A. BRUCE RICHTER, MARGARET RIDENOUR-BENDER, and

MIKE TSAO Mar. 1992 74 p (Contract F04606-89-D-0036)

(DOT/FAA/CT-91/10) Avail: CASI HC A04/MF A01

The engine subpanel of the June 1988 International Conference on Aging Airplanes identified the need to study aircraft turbine engine static components for reliability problems resulting from aging effects. This study trended in-flight shutdowns and unscheduled removal rates of JT8D, CF6, and JT3D turbine aircraft engines for the two year period of February 1988 through January 1990. Specific engine components on the JT8D engines of air carriers frequently exceeding the industry norm during the trending period were identified. This review noted the following types of component failures occurring: hard failures, wear and tear/inspection structural failures, failures, diagnostic troubleshooting, and maintenance errors. In addition to specific JT8D engine components being identified, an ultrasonic inspection procedure was developed for the JT8D engine outer combustor

N92-28711# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

DIFFUSER CASING UPGRADE FOR AN ADVANCED TURBOFAN

G. A. KOOL, R. J. H. WANHILL, and C. E. W. LOOIJE 26 Mar. 1990 14 p Presented at the Conference for Life Assessment and Repair Technology for Combustion Turbine Section Components, Phoenix, AZ, 17-19 Apr. 1990 Prepared in cooperation with Royal Netherlands Air Force, The Hague and Turbine Support Europa, Tilburg, Netherlands

(NLR-TP-90097-U; ETN-92-91531) Avail: CASI HC A03/MF A01 A qualification program for upgrade modification and repair of diffuser casings for an advanced turbofan engine type is addressed. The methodology of setting up the program is described and technical aspects are surveyed, paying special attention to critical upgrade/repair items, capability demonstrations, supporting nondestructive inspection and mechanical and metallurgical testing.

N92-28985*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ELECTROMECHANICAL SYSTEMS WITH TRANSIENT HIGH POWER RESPONSE OPERATING FROM A RESONANT AC LINK

LINDA M. BURROWS and IRVING G. HANSEN 1992 6 p Proposed for presentation at the 27th Intersociety Energy Conversion Engineering Conference, San Diego, CA, 3-7 Aug. 1992; sponsored by SAE, ACS, AIAA, ASME, IEEE, AIChE, and ANS (Contract RTOP 906-11-03)

(NASA-TM-105716; E-7113; NAS 1.15:105716) Avail: CASI HC A02/MF A01

The combination of an inherently robust asynchronous (induction) electrical machine with the rapid control of energy provided by a high frequency resonant AC link enables the efficient management of higher power levels with greater versatility. This could have a variety of applications from launch vehicles to all-electric automobiles. These types of systems utilize a machine which is operated by independent control of both the voltage and frequency. This is made possible by using an indirect field-oriented control method which allows instantaneous torque control in all four operating quadrants. Incorporating the AC link allows the converter in these systems to switch at the zero crossing of every half cycle of the AC waveform. This zero loss switching of the link allows rapid energy variations to be achieved without the usual frequency proportional switching loss. Several field-oriented control systems were developed by LeRC and General Dynamics Space Systems Division under contract to NASA. A description of a single motor, electromechanical actuation system is presented. Then, focus is on a conceptual design for an AC electric vehicle. This design incorporates an induction motor/generator together with a flywheel for peak energy storage. System operation and implications along with the associated circuitry are addressed. Such a system would greatly improve all-electric vehicle ranges over the Federal Urban Driving Cycle (FUD). Author

N92-29425*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

EFFECTS OF BLEED AIR EXTRACTION ON THRUST LEVELS ON THE F404-GE-400 TURBOFAN ENGINE

ANDREW J. YUHAS (PRC Kentron, Inc., Edwards, CA.) and RONALD J. RAY Jul. 1992 15 p Presented at the 28th AIAA Joint Propulsion Conference, Nashville, TN, 6-8 Jul. 1992 (Contract RTOP 505-68-30)

(NASA-TM-104247; H-1806; NAS 1.15:104247; AIAA PAPER 92-3092) Avail: CASI HC A03/MF A01

A ground test was performed to determine the effects of compressor bleed flow extraction on the performance of F404-GE-400 afterburning turbofan engines. The two engines were installed in the F/A-18 High Alpha Research Vehicle at the NASA Dryden Flight Research Facility. A specialized bleed ducting system was installed onto the aircraft to control and measure engine bleed airflow while the aircraft was tied down to a thrust measuring stand. The test was conducted on each engine and at various power settings. The bleed air extraction levels analyzed included flow rates above the manufacturer's maximum specification limit. The measured relationship between thrust and bleed flow extraction was shown to be essentially linear at all power settings with an increase in bleed flow causing a corresponding decrease in thrust. A comparison with the F404-GE-400 steady-state engine simulation showed the estimation to be within +/-1 percent of measured thrust losses for large increases in bleed flow rate.

N92-29427*# DieselDyne Corp., Morrow, OH.
A PRELIMINARY DESIGN AND ANALYSIS OF AN ADVANCED HEAT-REJECTION SYSTEM FOR AN EXTREME ALTITUDE ADVANCED VARIABLE CYCLE DIESEL ENGINE INSTALLED IN A HIGH-ALTITUDE ADVANCED RESEARCH PLATFORM RICHARD P. JOHNSTON Jul. 1992 55 p (Contract NAS2-131313; RTOP 505-69-14) (NASA-CR-186021; H-1775; NAS 1.26:186021) Avail: CASI HC A04/MF A01

Satellite surveillance in such areas as the Antarctic indicates that from time to time concentration of ozone grows and shrinks. An effort to obtain useful atmospheric data for determining the causes of ozone depletion would require a flight capable of reaching altitudes of at least 100,000 ft and flying subsonically during the sampling portion of the mission. A study of a heat rejection system for an advanced variable cycle diesel (AVCD) engine was conducted. The engine was installed in an extreme altitude, high altitude advanced research platform. Results indicate that the waste heat from an AVCD engine propulsion system can be rejected at the maximum cruise altitude of 120,000 ft. Fifteen performance points, reflecting the behavior of the engine as the vehicle proceeded through the mission, were used to characterize the heat exchanger operation. That portion of the study is described in a appendix titled, 'A Detailed Study of the Heat Rejection System for an Extreme Altitude Atmospheric Sampling Aircraft,' by a consultant, Mr. James Bourne, Lytron, Incorporated.

N92-29659*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA.

FLIGHT EVALUATION OF AN EXTENDED ENGINE LIFE MODE ON AN F-15 AIRPLANE

LAWRENCE P. MYERS and TIMOTHY R. CONNERS Apr. 1992 29 p

(Contract RTOP 533-02-36)

(NASA-TM-104240; H-1764; NAS 1.15:104240) Avail: CASI HC A03/MF A01

An integrated flight and propulsion control system designed to reduce the rate of engine deterioration was developed and evaluated in flight on the NASA Dryden F-15 research aircraft. The extended engine life mode increases engine pressure ratio while reducing engine airflow to lower the turbine temperature at constant thrust. The engine pressure ratio uptrim is modulated in real time based on airplane maneuver requirements, flight conditions, and engine information. The extended engine life mode logic performed well, significantly reducing turbine operating temperature. Reductions in fan turbine inlet temperature of up to

80 F were obtained at intermediate power and up to 170 F at maximum augmented power with no appreciable loss in thrust. A secondary benefit was the considerable reduction in thrust-specific fuel consumption. The success of the extended engine life mode is one example of the advantages gained from integrating aircraft flight and propulsion control systems.

Author

N92-29661*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

CONTINGENCY POWER FOR A SMALL TURBOSHAFT ENGINE BY USING WATER INJECTION INTO TURBINE COOLING AIR

THOMAS J. BIESIADNY and GARY A. KLANN (Army Aviation Systems Command, Cleveland, OH.) 1992 10 p Prepared for presentation at the 80th Symposium on Heat Transfer and Cooling in Gas Turbines, Antalya, Turkey, 12-16 Oct. 1992; sponsored in part by AGARD Propulsion and Energetics Panel (Contract RTOP 505-68-32)

(NASA-TM-105680; AVSCOM-TR-92-C-019; E-7058; NAS 1.15:105680) Avail: CASI HC A02/MF A01

Because of one-engine-inoperative (OEI) requirements, together with hot-gas reingestion and hot-day, high-altitude take-off situations, power augmentation for multiengine rotorcraft has always been of critical interest. However, power augmentation by using overtemperature at the turbine inlet will shorten turbine life unless a method of limiting thermal and mechanical stress is found. A possible solution involves allowing the turbine inlet temperature to rise to augment power while injecting water into the turbine cooling air to limit hot-section metal temperatures. An experimental water injection device was installed in an engine and successfully tested. Although concern for unprotected subcomponents in the engine hot section prevented demonstration of the technique's maximum potential, it was still possible to demonstrate increases in power while maintaining nearly constant turbine rotor blade temperature.

N92-29927# Universitaet der Bundeswehr Muenchen, Neubiberg (Germany, F.R.). Fakultaet fuer Luft- und Raumfahrttechnik.

EXAMINATION OF THE MAIN ERROR FACTORS WITH REGARDS TO SECONDARY LOSSES IN COMPRESSION AND TURBINE CASCADES BY VARIATIONS OF THE BLADE PICTURE RATIO Ph.D. Thesis [UNTERSUCHUNG DER WESENTLICHEN EINFLUSSFAKTOREN AUF DIE SEKUNDAERVERLUESTE IN VERDICHTER- UND TURBINENGITTERN BEI VARIATION DES SCHAUELSEITENVERHAELTNISSES]
ROBERT WATZLAWICK 1991 196 p In GERMAN (ETN-92-91493) Avail: CASI HC A09/MF A03

Extensive experimental examinations were carried out for determining loss correlations. Three various chord lengths were considered for compressor and turbine profile, in order to obtain information on the influence of blade picture ratio. It is shown that the reduced secondary loss coefficient with the blade picture ratio is independent of blade height and chord length for compressor and turbine cascades. For turbines, the profile loss coefficient can be used with good approximation as a parameter for secondary loss coefficients, with regard to the strong interaction of profile boundary layer and channel vortex. This parameter is not suitable for compressor correlations.

80

AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

A92-45319 A PROGRESS REPORT ON ASTOVL CONTROL CONCEPT STUDIES UNDER THE VAAC PROGRAMME

O. P. NICHOLAS (Royal Aerospace Establishment, Bedford, IN: International Powered Lift Conference, London, England) Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.7.1-III.7.14. refs

A paper by Nicholas (1987) about the ASTOVL control concept studies under the VAAC program is updated. The experimental flight control system fitted to the VAAC aircraft is described. A broad spectrum of potential STOVL control concepts under consideration is outlined, with emphasis on the longitudinal plane. Attention is given to three broad longitudinal plane control concepts for the STOVL regime: three inceptors controlling pitch, thrust magnitude, and thrust direction; three inceptors controlling pitch, normal thrust component, and longitudinal thrust component; and two inceptors controlling total (aerodynamic plus thrust) normal force and total longitudinal force, with pitch responding as necessary to provide this. It is planned to apply increasing effort to the development of displays to match the characteristics of the different longitudinal control concepts and also to control in the lateral/directional sense.

A92-45320 National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

INTEGRATED FLIGHT/PROPULSION CONTROL FOR SUPERSONIC STOVL AIRCRAFT

JAMES A. FRANKLIN, MICHAEL W. STORTZ (NASA, Ames Research Center, Moffett Field, CA), and JAMES R. MIHALOEW (NASA, Lewis Research Center, Cleveland, OH) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.8.1-III.8.12. refs

A technology program to investigate integrated flight/propulsion control-system design for STOVL fighter aircraft is described. Integrated control systems being developed by U.S. industry for specific STOVL concepts are discussed. Attention is given to NASA involvement in the definition of control concepts, design-methods and flying-qualities criteria, and the evaluation of these concepts and criteria in analytical design studies, in ground-based experiments, and in flight on the Harrier V/STOL research aircraft. Initial fixed-base simulation experiments conducted for two STOVL fighter concepts are discussed. These simulations defined acceptable transition flight envelopes, determined control power used during transition and hover, and provided evaluations of the integration of the flight and propulsion controls to achieve good flying qualities throughout the low-speed flight envelope.

A92-45322

INTEGRATED FLIGHT CONTROL SYSTEMS -ARCHITECTURAL CONSIDERATIONS FOR FUTURE AIRCRAFT CONCEPTS

RICHARD B. SMITH (GEC Avionics, Ltd., Rochester, England) IN: International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.10.1-III.10.12. Copyright

The current generation of automatic flight control systems technology is reviewed in relation to the developing operational and logistical requirements, particularly for single crew air superiority vehicles. It is proposed that the requirements for reduced pilot workload and a mean time between mandatory maintenance specification will be met by an integrated vehicle management system concept. The design drivers involved in the development of an integrated approach to automatic vehicle management are reviewed in the context of the overall size and complexity of the task for ASTOVL aircraft. Consideration is given to the issues involved in interfunctional cooperation, system availability and integrity, and weight minimization. A control strategy for integrated flight and propulsion control is outlined. An architectural concept to meet extended off-base availability requirements without first line maintenance intervention is quantitatively justified. A candidate integrated vehicle management system architecture is proposed,

and recommendations for the development of the technologies essential to its creation are advanced.

A92-45382

CIVIL DEVELOPMENT AND CERTIFICATION OF A HELICOPTER AUTOMATIC APPROACH AND HOVER SYSTEM ON THE SIKORSKY S-76

SYDNEY E. GURLEY (Sikorsky Aircraft, West Palm Beach, FL) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 111-120. refs (SAE PAPER 911975) Copyright

A key element of the S-76 helicopter's digital automatic flight control system is a novel approach-and-hover electronic flight instrument system for all-weather search-and-rescue operations. More than 50 such automatic approaches have been made during certification by pilots of varied background and helicopter experience, in conditions that included nocturnal overwater approaches. The system has demonstrated the full range of search-and-rescue-related capabilities in all instrument meteorological conditions. O.C.

A92-45384

ESTIMATION OF SPACEPLANE LATERAL-DIRECTIONAL STABILITY AND CONTROL DERIVATIVES FROM DYNAMIC WIND TUNNEL TEST

MASAAKI YANAGIHARA, SEIZO SUZUKI, SHIGEO KAYABA, and KATSUICHI MUROTA (National Aerospace Laboratory, Chofu, IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 131-139. refs (SAE PAPER 911979) Copyright

Dynamic wind tunnel tests using a 5-percent cable-mounted model of the NAL spaceplane have been performed in the NAL low-speed large scale wind tunnel to identify the aerodynamic model including dynamic effects. During the test performed in March 1991, the lateral-directional motion was excited by aileron and rudder inputs. A flight path reconstruction was applied to the recorded data and a parameter identification study of the reconstructed data was undertaken to extract lateral-directional stability and control derivatives using the least square method. The estimated derivatives were compared with the results of static wind tunnel tests and theoretically estimated dynamic derivatives. They were also evaluated by comparing mathematically simulated time histories calculated using them with the wind tunnel test data. As a result, all major derivatives were estimated well and effectiveness of the dynamic test was shown. Author

A92-45450

IN-FLIGHT SIMULATION OF BACKSIDE OPERATING MODELS USING DIRECT LIFT CONTROLLER

YUKICHI TSUKANO (National Aerospace Laboratory, Chofu, Japan), MASAKI KOMODA (Tokyo Metropolitan Institute of Technology, Japan), NAGAKATU KAWAHATA (Nihon University, Chiba, Japan), and TOSHIHARU INAGAKI (National Aerospace Laboratory, Chofu, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 815-823. refs (SAE PAPER 912069) Copyright

Effectiveness of a direct lift controller (DLC) for in-flight simulation is discussed. When a model aircraft is operating in backside of power curve, DLC is indispensable. On the basis of this, quick-moving flaps are installed on the variable stability and response airplane of the National Aerospace Laboratory of Japan. Direct lift capability of the flaps are precisely identified. After tailoring adequate feedback/feed forward gains, a model-following system is constructed to simulate backside-operating models by a mother airplane which is operating in frontside. As an application, a flight test result for simulated landing approach in backside range is shown. Author

A92-45488#

RAPID SYNTHESIS FOR EVALUATING MISSILE **MANEUVERABILITY PARAMETERS**

PAKRAD A. GIRAGOSIAN (Wright Brothers Aerospace Systems. Concord, MA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 141-148, refs (AIAA PAPER 92-2615) Copyright

Theoretical and semi-empirical algorithms for the preliminary determination of a missile airframe's geometric and mass properties, aerodynamic characteristics, and propulsion parameters to fulfill given maneuverability requirements are presented. The expressions developed apply to a wide range of missile configurations and can be used, with reasonable accuracy, to define some of the more pertinent missile key design and performance parameters on a first-cut basis. Example computations are presented and compared to experimental data.

A92-46737

COMPARISON OF SIX ROBUSTNESS TESTS EVALUATING MISSILE AUTOPILOT ROBUSTNESS TO UNCERTAIN **AERODYNAMICS**

KEVIN A. WISE (McDonnell Douglas Missile Systems Co., Saint Louis, MO) (1990 American Control Conference, 9th, San Diego, CA, May 23-25, 1990, Proceedings. Vol. 1, p. 755-763) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 861-870. Previously cited in issue 11, p. 1707, Accession no. A91-30078. refs Copyright

A92-46739* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ON-LINE PERFORMANCE EVALUATION OF MULTILOOP **DIGITAL CONTROL SYSTEMS**

ANTHONY POTOTZKY (Lockheed Engineering and Sciences Co., Hampton, VA), CAROL WIESEMAN, SHERWOOD T. HOADLEY, and VIVEK MUKHOPADHYAY (NASA, Langley Research Center, Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 878-884. Previously cited in issue 21, p. 3317, Accession no. A90-47747. refs Copyright

A92-46741

APPROACH GUIDANCE IN A DOWNBURST

YIYUAN ZHAO (Minnesota, University, Minneapolis) and A. E. BRYSON (Stanford University, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 893-900, refs

Copyright

A nonlinear feedback law for safe aircraft penetration through downbursts on landing approach is presented. It is based on following a nominal approach path relative to the ground, subject to a minimum airspeed constraint. The guidance design uses a point-mass aircraft model and considers the flight path to be in the vertical plane. The slack variable transformation method is modified to handle the airspeed constraint and apply the nonlinear dynamic inversion technique for the guidance law synthesis. Nonlinear numerical simulation results are presented for three different downburst histories. The main features of the proposed guidance logic are normal behavior when there is no wind, tracking of the nominal path in the presence of downbursts, and insensitivity to different downburst models. Piloting implications and other aspects of landing approach in downbursts are discussed.

Author

A92-46742* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PARAMETER IDENTIFICATION OF LINEAR SYSTEMS BASED ON SMOOTHING

M. IDAN and A. E. BRYSON (Stanford University, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15.

no. 4, July-Aug. 1992, p. 901-911. Research supported by Advanced Rotorcraft Technology, Inc. Previously cited in issue 20, p. 3155, Accession no. A90-45156. refs (Contract NCC2-106) Copyright

A92-46749

X-29 H-INFINITY CONTROLLER SYNTHESIS

W. L. ROGERS and D. J. COLLINS (U.S. Naval Postgraduate School, Monterey, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 962-967, refs

H2 and H-infinity controllers have been designed for the unstable longitudinal analog backup mode of the X-29 aircraft. When actuator design limitations are considered, the expected superiority of the H-infinity design over the H2 design is not obtained. The limited performance designs also do not exhibit the precision flight-path control modes that are characteristic of the H-infinity designs. Author

A92-46750

THRUST LAWS FOR MICROBURST WIND SHEAR PENETRATION

MARK L. PSIAKI and KIHONG PARK (Cornell University, Ithaca, Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 968-975. Previously cited in issue 23, p. 3621, Accession no. A89-52645. refs Copyright

A92-46751* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NONLINEAR INVERSION FLIGHT CONTROL FOR A SUPERMANEUVERABLE AIRCRAFT

S. A. SNELL, DALE F. ENNS, and WILLIAM L. GARRARD, JR. (Minnesota, University, Minneapolis) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 976-984. Previously cited in issue 21, p. 3315, Accession no. A90-47661. refs (Contract NAG1-321) Copyright

A92-46752

INTEGRATED AEROSERVOELASTIC WING SYNTHESIS BY NONLINEAR PROGRAMMING/APPROXIMATION CONCEPTS

E. LIVNE (Washington, University, Seattle), P. P. FRIEDMANN, and L. A. SCHMIT (California, University, Los Angeles) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 985-993. refs (Contract F49620-87-K-0003) Copyright

Nonlinear programming/approximation concepts optimization techniques developed for structural synthesis are adapted to the integrated aeroservoelastic wing synthesis problem, in which constraints from several disciplines are taken into account simultaneously and the design space includes structural and control system design variables. Structural, aerodynamic, and control system mathematical models that are suitable for the preliminary design of airplanes are used in an integrated synthesis of wings and their active control systems. The effectiveness and efficiency of the new capability are studied using mathematical models of a remotely piloted vehicle as well as a more complex YF16-type airplane model. Simplified handling quality constraints are added to the set of design requirements. The performance of several complex eigenvalue approximations is examined. Effects of control law structure on the weight and robustness of the resulting aeroservoelastic designs provide new insights into the complex multidisciplinary interactions involved. Author

A92-46761

SYMPTOM OF PAYLOAD-INDUCED FLIGHT INSTABILITY

CHARLES H. MURPHY (U.S. Army, Ballistic Research Laboratory, Aberdeen Proving Ground, MD) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 1038-1040. refs

The correlation between spin and side moment is used as a diagnostic for payload-induced instability. The paper reviews the experimental observations and theories that deal with this relation for a variety of moving components. A very simple relation that applies to all moving payloads in steady-state motion is derived, thus validating the diagnostic tool. It is noted that the presence of payload-induced side moment can always be identified by the roll moment for large coning motion. More importantly, the payload side moment can be measured in ground tests by measurement of the spin moment exerted by a payload doing a forced coning motion.

A92-46765

HANG-GLIDER RESPONSE TO ATMOSPHERIC INPUTS

GUIDO DE MATTEIS (Roma I, Universita, Rome, Italy) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 1048-1050. refs Copyright

Hang-glider flight in a turbulent atmosphere is presently considered in a framework where, in analogy for conventional aircraft, hang-glider response to atmospheric inputs is characterized in terms of gust-transfer functions and the power spectral densities of the output. Attention is given to longitudinal motion; the gust transfer functions of the longitudinal state variables and of the load factor are determined, and the effects of approximations connected with the modeling of the inputs are discussed in light of characteristic frequencies for the glider in cruise conditions.

ററ

A92-46776

FLIGHT MODEL FOR UNMANNED SIMULATED HELICOPTERS

AMNON KATZ (Alabama, University, Tuscaloosa) and BRETT E. BUTLER (McDonnell Douglas Helicopter Co., Mesa, AZ) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 521-526. refs

Copyright

This paper presents flight model for use in simulating computer generated helicopters. Momentum and energy balance is used to define a rotor thrust envelope. The four basic control inputs take the form of thrust components and the sideslip angle. Time integrations are performed for the three center of mass degrees of freedom only. Six degrees of freedom information is derived for the visual displays. The model can inexpensively function in real time and faster than real time. Validity is demonstrated by comparing model performance predictions with published data.

Author

A92-46777

RECONSTRUCTION OF FLIGHT PATH IN TURBULENCE

QING CHEN (Braunschweig, Technische Universitaet, Federal Republic of Germany) and YUAN LIN (DLR, Institut fuer Flugmechanik, Braunschweig, Federal Republic of Germany) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 527-531. refs

Copyright

In the majority of previous investigations, compatibility checks of measured flight data have been carried out under the assumption of smooth air, neglecting atmospheric turbulence mainly because of its complexity of modeling. Based on the essential view of system theory, this paper proposes an effective strategy to reconstruct the flight path in turbulent air in two steps: (1) as in conventional methods, an error model for sensors, processors and a stationary windfield model are identified from flight maneuvers in smooth air; and (2) retaining some of the first step results pertaining to the inherent characteristics of data measurement and acquisition systems, a data consistency check for flight data in turbulent air is carried out using the same method as that in step 1 above. The two-step procedure eliminates the need for a turbulence model and, thus, yields identification results that are independent of wind model. Furthermore, use of this approach makes it possible to evaluate the precision of onboard wind

measurement. The utility of the proposed approach is demonstrated by reconstruction of longitudinal flight path from flight test in turbulence with the research aircraft DORNIER DO128. Author

A92-46794

MAXIMIZING THRUST-VECTORING CONTROL POWER AND AGILITY METRICS

BENJAMIN Z. GAL-OR (Technion - Israel Institute of Technology, Haifa) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 647-651. refs Copyright

A new set of standard agility comparison maneuvers (SACOM) is proposed for testing the maximization of thrust-vectoring control power during poststall, manned, and unmanned flight tests. An innovative approach is presented to help define and simulate agility in a low cost manner by means of unmanned scaled models. Debated agility metrics are reassessed in light of new developments in multiaxis thrust vectoring. A methodology for measuring and maximizing TV-agility under PST conditions has been identified. Excellent controllability and very rapid nose pointing are easily obtainable during PST-TV maneuvers. TV-agility is an interdisciplinary subject involving a revolution in engineering and pilot education.

A92-46802* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

SELF-INDUCED ROLL OSCILLATIONS OF LOW-ASPECT-RATIO RECTANGULAR WINGS

DANIEL LEVIN (NASA, Ames Research Center, Moffett Field, CA)

and JOSEPH KATZ (San Diego State University, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 698-702. Previously cited in issue 20, p. 3155, Accession no. A90-45151. refs

(Contract NCC2-458)

Copyright

A92-46810

PITCH RATE/SIDESLIP EFFECTS ON LEADING-EDGE EXTENSION VORTICES OF AN F/A-18 AIRCRAFT MODEL

SHESHAGIRI K. HEBBAR, MAX F. PLATZER (U.S. Naval Postgraduate School, Monterey, CA), and ODILON V. CAVAZOS (U.S. Navy, Naval Air Station, San Diego, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 720-723. Research sponsored by U.S. Navy. Previously cited in issue 06, p. 797, Accession no. A91-19216. refs

A92-46923

AEROMECHANICAL STABILITY OF HINGELESS HELICOPTER ROTORS IN FORWARD FLIGHT

WAI Y. CHAN and INDERJIT CHOPRA (Maryland, University, College Park) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 6-1 to 6-22. refs

(Contract DAAL03-88-C-0002)

The present investigation of hingeless rotors' aeromechanical stability in forward flight uses a simple flap-lag blade model and a pitch-and-roll degree-of-freedom rigid-body fuselage mode, in conjunction with a dynamic inflow modeling of unsteady aerodynamic effects. Parametric studies are conducted to study the aeromechanical stability effects of several design parameters, encompassing forward speed, Lock number, thrust level, structural coupling, pitch-lagcoupling, body pitch and roll degrees of freedom, blade-lag stiffness, and dynamic inflow. Air resonance instability is stabilized for moderate forward speeds, but becomes more unstable at high forward speeds. Higher thrust and Lock number also aggravate this instability.

A92-46931* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PERIODIC TRIM SOLUTIONS WITH HP-VERSION FINITE ELEMENTS IN TIME

LIN-JUN HOU and DAVID A. PETERS (Georgia Institute of

Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 18-1 to 18-18. Previously announced in STAR as N91-13449. refs

(Contract NAG1-1027)

Finite elements in time as an alternative strategy for rotorcraft trim problems are studied. The research treats linear flap and linearized flap-lag response both for quasi-trim and trim cases. The connection between Fourier series analysis and hp-finite elements for periodic a problem is also examined. It is proved that Fourier series is a special case of space-time finite elements in which one element is used with a strong displacement formulation. Comparisons are made with respect to accuracy among Fourier analysis, displacement methods, and mixed methods over a variety parameters. The hp trade-off is studied for the periodic trim problem to provide an optimum step size and order of polynomial for a given error criteria. It is found that finite elements in time can outperform Fourier analysis for periodic problems, and for some given error criteria. The mixed method provides better results than does the displacement method.

A92-46933

COMPUTATIONAL ASPECTS OF HELICOPTER TRIM ANALYSIS AND DAMPING LEVELS FROM FLOQUET THEORY

N. S. ACHAR and G. H. GAONKAR (Florida Atlantic University, Boca Raton) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 20-1 to 20-14. refs

(Contract DAAL03-87-K-0037)

The computational reliability and time requirement are investigated for a time analysis for periodic initial state and control inputs, as well as eigenanalysis, of the Floquet transition matrix. The trim analysis employs both the shooting method and a weak version of a temporal FEM with mixed formulation of displacements and momenta. In each method, the initial state and control inputs are computed both sequentially and simultaneously; the resulting nonlinear algebraic equations are solved by damped Newton iteration, with an optimally selected damping parameter which virtually eliminates divergence between the two trim analysis methods.

A92-47777

MATHEMATICAL MODELING OF THE FLIGHT OF PASSENGER AIRCRAFT IN THE CASE OF ENGINE FAILURE [MODELOWANIE MATEMATYCZNE LOTU SAMOLOTU PASAZERSKEGO W STANACH AWARII SILNIKOW]

REALY FLOUTI and JERZY MARYNIAK (Warsaw University of Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 135-141. In Polish. refs

The effects of engine failure and fuselage deformation on the flight dynamics of a passenger aircraft with tail-mounted engines are examined, with the IL-62M aircraft used as an example. In the analysis, the aircraft is treated as a rigid body with six degrees of freedom, with allowance for the possibility of the flexural deformation of the tail section. The equations of aircraft motion are derived using Boltzmann-Hamel equations for mechanical systems with holonomic constraints. The motion of the aircraft in the case of engine failure is simulated numerically using fifth- and sixth-order Runge-Kutta-Verner methods. Results of calculations are presented in graphic form.

A92-47779

CALCULATION OF THE AERODYNAMIC DERIVATIVES OF AIRCRAFT IN THE SUPERSONIC REGION USING THE MACH BOX METHOD [OBLICZANIE POCHODNYCH AERODYNAMICZNYCH SAMOLOTU W ZAKRESIE NADDZWIEKOWYM PRZY ZASTOSOWANIU METODY 'PUDELEK MACHA']

TOMASZ GOETZENDORF-GRABOWSKI (Warsaw University of

Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 151-157. In Polish. refs

Physical and mathematical models are presented which describe the motion of an aircraft in steady supersonic potential flow of a gas. A numerical method for calculating the aerodynamic parameters is proposed which is referred to as the Mach box method. Results of calculations are presented.

A92-47783

MODELING OF THE CONTROL SYSTEMS OF ROTARY WING AIRCRAFT (REVIEW) [MODELOWANIE UKLADOV STEROWANIA WIROPLATOW (REFERAT PRZEGLADOWY)]

WIESLAW LUCJANEK and JANUSZ MARKIEWICZ (Warsaw University of Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 243-249. In Polish refs

Methods for controlling the flight of rotary wing aircraft are discussed, as are physical models used for the analysis of flight control systems. In particular, attention is given to some new approaches to rotary wing aircraft control, such as higher harmonic control, individual blade control, fly by wire control, side stick control, voice control, and pilot head movement control. Schemes of tilt rotor control and control mechanisms used in helicopter and airplane mode flights are shown.

A92-47784

MATHEMATICAL MODELING OF THE EFFECT OF WINDSHEAR ON THE DYNAMICS OF A LANDING AIRCRAFT [MODELOWANIE MATEMATYCZNE WPLYWU ZMIENNEGO RUCHU POWIETRZA NA DYNAMIKE LADUJACEGO SAMOLOTU]

JERZY MARYNIAK and JIMOH PEDRO (Warsaw University of Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 257-264. In Polish. refs

The dynamic characteristics of a multiple-engine aircraft during an approach to landing are modeled mathematically. A complete set of nonlinear equations of motion is derived for the aircraft, with three-dimensional variable wind and windshear terms included. Changes of the aerodynamic coefficients due to windshear are computed on the basis of quasi-steady aerodynamics.

A92-47785

AIRCRAFT STABILIZATION AT LARGE ANGLES OF ATTACK [STABILIZACJA SAMOLOTU NA DUZYCH KATACH NATARCIA]

WIESLAW J. J. MICHALSKI and MARIA ZLOCKA (Warsaw University of Technology, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 283-290. In Polish. refs

Based on physical and mathematical modeling, a system of nonlinear equations of motion is obtained for a rigid aircraft with six degrees of freedom. For steady straight horizontal flight at large angles of attack, an optimal control law is synthesized for a quadratic quality criterion. It is shown that the required flight conditions can be maintained using active control based on a certain law. Results of a numerical simulation of the motion of an actively controlled aircraft are presented.

A92-47786

A NEW METHOD OF HELICOPTER ROTOR BLADE MOTION CONTROL [NOWA METODA STEROWANIA RUCHEM LOPAT WIRNIKOW SMIGLOWCOW]

JANUSZ NARKIEWICZ, WIEŚLAW LUCJANEK (Warsaw University of Technology, Poland), TOMASZ BARTLER (Aviation Institute, Warsaw, Poland), and JACEK SYRYCZYNSKI (PZL Okecie, Warsaw, Poland) Politechnika Slaska, Zeszyty Naukowe, Mechanika (ISSN 0434-0817), no. 107, 1992, p. 299-303. In Polish. refs

A method of helicopter rotor blade motion control is proposed which makes it possible to reduce the level of vibration. For a

general model of an isolated rotor blade, active optimal control with a quadratic quality index is used. The method is also applicable to other plants with lifting surfaces.

A92-48160* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

NONLINEAR CONTROL DESIGN FOR SLIGHTLY **NONMINIMUM PHASE SYSTEMS - APPLICATION TO V/STOL AIRCRAFT**

JOHN HAUSER (Southern California, University, Los Angeles, CA), SHANKAR SASTRY (California, University, Berkeley), and GEORGE MEYER (NASA, Ames Research Center, Moffett Field, CA) Automatica (ISSN 0005-1098), vol. 28, no. 4, July 1992, p. 665-679. Research supported by Schlumberger Foundation and Berkeley Engineering Fund. refs (Contract NAG2-243)

Copyright

The paper describes the application of techniques of exact I/O linearization of nonlinear control systems to the flight control of V/STOL aircraft. It is seen that the application of the theory to this example is not straightforward; in particular, the direct application of the theory yielded an undesirable controller. The situation was remedied by neglecting the coupling between the rolling moment input to the aircraft dynamics and the dynamics along the y-axis. An approximate I/O linearization procedure developed for slightly nonminimum phase nonlinear systems is shown to be effective for V/STOL aircraft.

A92-48487

THE PROPULSIVE-ONLY FLIGHT CONTROL PROBLEM

DANIEL J. BIEZAD (California Polytechnic State University, San Luis Obispo) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 494-500. refs

Copyright

Attitude control of aircraft using only the throttles is investigated. The long time constants of both the engines and the aircraft dynamics, together with the coupling between longitudinal and lateral aircraft modes, make piloted flight with failed control surfaces hazardous, especially when trying to land. In the present work, the author documents the results of in-flight operation using simulated failed flight controls and ground simulations of piloted propulsive-only control to touchdown. Augmentation control laws to assist the pilot are described using both optimal control and classical feedback methods. Piloted simulation using augmentation shows that simple and effective augmented control can be achieved in a wide variety of failed configurations.

A92-48488

ANALYSIS OF THE VISTA LONGITUDINAL SIMULATION CAPABILITY FOR A CRUISE FLIGHT CONDITION

BA T. NGUYEN, LYNNE T. HAMILTON-JONES, and DAVID B. LEGGETT (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 501-507. refs

The Variable Stability In-Flight Simulator Test Aircraft (VISTA) is the next-generation US in-flight simulator for high-performance aircraft currently being developed by the US Air Force. In the present analysis, the authors estimate the range of dynamic response characteristics that the VISTA can simulate for the longitudinal mode of an up-and-away flight condition. The analysis matched the angle-of-attack time response of a low-order model to a linear simulation of the VISTA aircraft for a range of feedback gain sets. The analysis indicates that the VISTA aircraft does not meet the goal for up-and-away short-period mode. VISTA also does not meet the requirement for having less than 70 msec of equivalent time delay between the model and VISTA aircraft response for an aircraft with no time delay. This will have less effect in practice because all modern aircraft have time delay due to actuators and computations from hardware and software.

A92-48490

F-16 FAILURE DETECTION ISOLATION AND ESTIMATION

YING-JYI P. WEI and SHAHROKH GHAYEM (General Dynamics Corp., Fort Worth, TX) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 515-521. refs Copyright

The authors discuss the evaluation of a modified multiple hypothesis FDIE (failure detection, isolation, and estimation) scheme in a high-fidelity nonlinear six-degree-of-freedom F-16 simulation. They present examples of detection of horizontal tail failure at an air combat maneuver entry flight condition, and rudder failure while maneuvering at supersonic speed and low altitude. The simulation results indicate that the FDIE can function properly within a fraction of a second. Thus, further control law reconfiguration and positive pilot alert are possible to benefit the F-16's combat capabilities.

A92-48491

SIMPLE FLY-BY-WIRE ACTUATOR

GAVIN D. JENNEY (Dynamic Controls, Inc., Dayton, OH) NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 522-528. refs

(Contract F33615-86-C-3606)

Copyright

The research and development of a simple fly-by-wire (FBW) hydraulic actuator is described. The actuator incorporated a pair of two-position valves for fluid metering. The valves were designed for high response and were driven by a pulse-width-modulated control signal. The actuator was designed to have the nominal force, slew rate, and frequency response of an F-16 Horizontal Tail/Flaperon Integrated Servo Actuator (ISA) when operating with one hydraulic supply system. The simple actuator configuration demonstrated control characteristics and input/output performance characteristics that equal or exceed current FBW actuator configurations (particularly the characteristics of frequency response and threshold). The power input for the control valves (29 W at 100 percent modulation) is consistent with modern direct drive FBW analog control valve power requirements. The response time for the valves was satisfactory for the control of the actuator.

A92-48492

VARIABLE DISPLACEMENT ELECTRO-HYDROSTATIC **ACTUATOR**

JOHN A. ANDERSON (Dynamic Controls, Inc., Dayton, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 529-534.

(Contract F33615-86-C-3606)

The author discusses the effects of pump displacement on electro-hydrostatic actuator (EHA) performance characteristics and the possible advantages of using a variable displacement pump in an EHA. Issues discussed are heating, size, and stiffness. It is noted that the EHA offers the possibility of varying the coupling ratio by varying the pump displacement. The variable coupling ratio could be used to increase actuator stiffness, to decrease package size, and to decrease package heating. An EHA employing a variable displacement pump has been designed and built, and the actuator will be tested once assembly of the package is completed.

A92-48493

C-141 AND C-130 POWER-BY-WIRE FLIGHT CONTROL **SYSTEMS**

RALPH ALDEN (Lockheed Aeronautical Systems Co., Marietta, GA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 535-539. refs

Copyright

The C-141 RAMTIP (Reliability and Maintainability Technology Insertion Program) project comprises the development, test, and flight evaluation of fly-by-wire/power-by-wire flight controls for the three primary axes, plus spoilers, on the C-141 aircraft. The C-130 TAPM (Technology Application Program Management) project comprises the development, test, and flight evaluation of an electro-hydrostatic actuation (EHA) subsystem in the HTTB (High Technology Test Bed) aileron system. The author describes the systems being investigated and summarizes the laboratory and flight test demonstrations that have been accomplished to date. He also addresses current and planned programs for further development, test installations, and flight demonstrations of power-by-wire primary flight control systems.

A92-48494

ELECTRIC ACTUATION SYSTEM DUTY CYCLES

CRAIG J. SIMSIC (Lockheed Aeronautical Systems Co., Marietta, GA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 540-545. refs

Copyright

An important criterion in specifying an electric actuation system (EAS) is the duty cycle to which it must be designed and tested. The author describes the derivation of such a duty cycle in a very fundamental fashion. This fundamental duty cycle would of course be further refined in a real exercise, the treatment becoming as eloquent as the problem demands. The mission profile (altitude and velocity vs. time) of a generic transport aircraft along with actuator force and rate requirements is the starting point for this exercise. From these data, a fundamental duty cycle, load, heat dissipation, and power required are estimated as a function of mission time. This leads to a discussion of EAS circuit design impact and to the derivation of a limited life test duty cycle. I.E.

A92-48495

ROBUST DISCRETE CONTROLLER DESIGN FOR AN UNMANNED RESEARCH VEHICLE (URV) USING DISCRETE QUANTITATIVE FEEDBACK THEORY

D. G. WHEATON, I. M. HOROWITZ, and C. H. HOUPIS (USAF, Institute of Technology, Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 546-552. refs

The application of non-minimum phase w-prime-plane discrete MIMO (multiple-input-multiple-output) quantitative feedback theory (QFT) to the design of a three-axis rate-commanded automatic flight control system for a URV is presented. The URV model used is a seven-input three-output state-space system derived from the small-angle perturbation equations of motion. The controllers and prefilters designed provide a three-axis noninteracting rate-commanded automatic flight control law implementation on the Lambda URV. Hybrid nonlinear simulations verify the successful application of discrete QFT. The yaw-rate channel meets all specifications.

A92-48496

ROBUSTNESS CHARACTERISTICS OF FAST-SAMPLING DIGITAL PI CONTROLLERS FOR HIGH-PERFORMANCE AIRCRAFT WITH IMPAIRED CONTROL SURFACES

B. PORTER (Salford, University, England) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 553-563. refs
Copyright

The robustness characteristics of fast-sampling error-actuated digital set-point tracking PI controllers are established in the case of partially irregular linear multivariable plants. It is shown that the

plant-parameter variations tolerable by such fast-sampling error-actuated digital controllers can be expressed very simply in terms of the step-response matrices of the nominal and actual plants. These general results are illustrated by examining the robustness characteristics of a fast-sampling error-actuated digital PI controller for the F-16 aircraft in case the flaperon and elevator suffer various losses in effectiveness.

A92-48499

MAKING FLY-BY-LIGHT A REALITY

JOHN R. TODD (Douglas Aircraft Co., Long Beach, CA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 577-584. Copyright

McDonnell Douglas, Douglas Aircraft Company, has constructed and integrated a fly-by-wire/fly-by-light test and integration facility to aid in the development of advanced design flight control systems. The author describes this facility, its capabilities, and the Douglas fly-by-light development approach. A summary of the Douglas Aircraft Advanced Flight Control Systems Development Program is also provided.

A92-48608

ADVANCES IN AIRCRAFT MODAL IDENTIFICATION [PROGRES EN IDENTIFICATION MODALE DES AVIONS]

ALAIN GRAVELLE (ONERA, Direction Scientifique des Structures, Chatillon, France) (Entretiens Science et Defense 1992, Paris, France, May 12, 13, 1992) ONERA, TP no. 1992-47, 1992, 11 p. In French. refs

(ONERA, TP NO. 1992-47)

The modal identification of aircraft structures is conducted by ground vibration tests employing the modal adaptation technique. The efficiency of this technique can be enhanced by introducing methods that aid in performing the adaptation, utilizing a modal isolation criterion resulting in a simpler procedure to drive the tests. Association with the use of multidegree-of-freedom identification algorithms would introduce some tolerance in connection with the adaptation deviations, which makes it possible to account for modal couplings.

A92-48737*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THRUST VECTORING CHARACTERISTICS OF THE F-18 HIGH ALPHA RESEARCH VEHICLE AT ANGLES OF ATTACK FROM 0 TO 70 DEG

SCOTT C. ASBURY and FRANCIS J. CAPONE (NASA, Langley Research Center, Hampton, VA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 19 p. refs (AIAA PAPER 92-3095)

An investigation was conducted to determine the multiaxis thrust-vectoring characteristics of the F-18 High Alpha Research Vehicle (HARV). A 0.10-scale model was modified with hardware to simulate the three-vane thrust vectoring system of the F-18/HARV. This investigation was conducted at Mach numbers ranging from 0.30 to 0.70, at angles of attack from 0 to 70 deg, and nozzle-pressure ratios from 2.0 to approximately 5.0. Results indicate that the thrust vectoring system of F-18/HARV can successfully generate multiaxis thrust vectoring. During vectoring, resultant thrust-vector angles were always less than the corresponding geometric vane deflection angle and were accompanied by large thrust losses.

A92-48902*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA. SUMMARY OF THE EFFECTS OF ENGINE THROTTLE

RESPONSE ON AIRPLANE FORMATION-FLYING QUALITIES

KEVIN R. WALSH (NASA, Flight Research Center, Edwards, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 22 p. refs (AIAA PAPER 92-3318) Copyright

A flight evaluation as conducted to determine the effect of throttle response characteristics on precision formation-flying qualities. A variable electronic throttle control system was developed and flight-tested on a TF-104G airplane with a J79-11B engine at the NASA Dryden Flight Research Facility. Ten research flights were flown to evaluate the effects of throttle gain, time delay, and fuel control rate limiting on engine handling qualities during a demanding precision wing formation task. Handling quality effects of lag filters and lead compensation time delays were also evaluated. Data from pilot ratings and comments indicate that throttle control system time delays and rate limits cause significant degradations in handling qualities. Threshold values for satisfactory (level 1) and adequate (level 2) handling qualities of these key variables are presented.

A92-49025#

A THEORETICAL STUDY OF SENSOR-ACTUATOR SCHEMES FOR ROTATING STALL CONTROL

G. J. HENDRICKS and D. L. GYSLING (MIT, Cambridge, MA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by USAF and Pratt & Whitney Group. refs (AIAA PAPER 92-3486) Copyright

A theoretical study has been conducted to determine the influence of actuator and sensor choice on active control of rotating stall in axial-flow compressors. The sensors are used to detect the small amplitude traveling waves that have been observed at the initiation of rotating stall on several different compressors. Control is achieved by feeding the sensed quantity back to the actuator with a suitable gain and spatial phase shift relative to the measured wave. Actuators using circumferential patterns of jets, intake ports, and movable inlet guide vanes upstream of the compressor, and valves downstream of the compressor were considered. The effect of axial velocity, static pressure, or total pressure measurement on control effectiveness was investigated. In addition, the influence of the actuator bandwidth on the performance of the controlled system was determined. The results of the study indicate that the potential for active control of rotating stall is greater than that achieved thus far with movable inlet quide vanes. Further, axial velocity sensing was most effective. Actuator bandwidth affected the performance of the controlled compressors significantly, but certain actuators were affected less severely than others.

A92-49109*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA. SUBSONIC FLIGHT TEST EVALUATION OF A PERFORMANCE SEEKING CONTROL ALGORITHM ON AN F-15 AIRPLANE GLENN B. GILYARD and JOHN S. ORME (NASA, Flight Research

Center, Edwards, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 18 p. refs

(AIAA PAPER 92-3743) Copyright

The subsonic flight test evaluation phase of the NASA4 F-15 (powered by F100 engines) performance-seeking control program was completed for single-engine operation at part- and military-power settings. The subsonic performance-seeking control algorithm optimizes the quasi-steady-state performance of the propulsion system for three modes of operation: minimum-fuel-flow mode, the minimum-temperature mode, and the maximum-thrust mode. Decreases in thrust-specific consumption of 1 to 2 percent were measured in the minimum-fuel-flow mode; these fuel savings are significant especially for supersonic cruise aircraft. Decreases of up to approximately 100 R in fan turbine inlet temperature were measured in the minimum-temperature mode. Temperature reductions of this magnitude would more than double turbine life if inlet temperature was the only life factor. Measured thrust increases of up to approximately 15 percent in the maximum-thrust mode cause substantial increases in aircraft acceleration. The subsonic flight phase has validated the performance-seeking control technology which can significantly benefit the next generation of fighter and transport aircraft. Author

N92-28457*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

COMPARISON OF THREE CONTROLLERS APPLIED TO HELICOPTER VIBRATION

JANE A. LEYLAND May 1992 79 p (Contract RTOP 505-61-51)

(NASA-TM-102192; A-89130; NAS 1.15:102192) Avail: CASI HC A05/MF A01

A comparison was made of the applicability and suitability of the deterministic controller, the cautious controller, and the dual controller for the reduction of helicopter vibration by using higher harmonic blade pitch control. A randomly generated linear plant model was assumed and the performance index was defined to be a quadratic output metric of this linear plant. A computer code. designed to check out and evaluate these controllers, was implemented and used to accomplish this comparison. The effects of random measurement noise, the initial estimate of the plant matrix, and the plant matrix propagation rate were determined for each of the controllers. With few exceptions, the deterministic controller yielded the greatest vibration reduction (as characterized by the quadratic output metric) and operated with the greatest reliability. Theoretical limitations of these controllers were defined and appropriate candidate alternative methods, including one method particularly suitable to the cockpit, were identified.

Author

N92-28584*# Systems Technology, Inc., Hawthorne, CA. EFFECTS OF COCKPIT LATERAL STICK CHARACTERISTICS ON HANDLING QUALITIES AND PILOT DYNAMICS

DAVID G. MITCHELL, BIMAL L. APONSO, and DAVID H. KLYDE Washington NASA Jun. 1992 208 p Prepared for PRC Kentron, Inc., Edwards, CA

(Contract NAS2-12722; ATD-90-STI-6401; RTOP 505-64-30) (NASA-CR-4443; H-1769; NAS 1.26:4443) Avail: CASI HC A10/MF A03

This report presents the results of analysis of cockpit lateral control feel-system studies. Variations in feel-system natural frequency, damping, and command sensing reference (force and position) were investigated, in combination with variations in the aircraft response characteristics. The primary data for the report were obtained from a flight investigation conducted with a variable-stability airplane, with additional information taken from other flight experiments and ground-based simulations for both airplanes and helicopters. The study consisted of analysis of handling qualities ratings and extraction of open-loop, pilot-vehicle describing functions from sum-of-sines tracking data, including, for a limited subset of these data, the development of pilot models. The study confirms the findings of other investigators that the effects on pilot opinion of cockpit feel-system dynamics are not equivalent to a comparable level of added time delay, and until a more comprehensive set of criteria are developed, it is recommended that feel-system dynamics be considered a delay-inducing element in the aircraft response. The best correlation with time-delay requirements was found when the feel-system dynamics were included in the delay measurements, regardless of the command reference. This is a radical departure from past approaches. Author

N92-28652# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

SOME LONGITUDINAL HANDLING QUALITIES DESIGN GUIDELINES FOR ACTIVE CONTROL TECHNOLOGY TRANSPORT AIRCRAFT

W. P. DEBOER (Office National d'Etudes et de Recherches Aerospatiales, Paris (France).), H. T. HUYNH (Office National d'Etudes et de Recherches Aerospatiales, Paris, France), O. P. NICHOLAS (Royal Aerospace Establishment, Farnborough, England), D. SCHAFRANEK (Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick, Germany, F.R.), and J. A. J. VANENGELEN 11 May 1990 21 p (NLR-TP-90129-U; GARTEUR/TP-056; ETN-92-91435) Avail: CASI HC A03/MF A01

The main conclusions and recommendations from extensive

work performed by the Flight Mechanics Action Group on handling qualities (FM/AG01) of the Group for Aeronautical Research and Technology in Europe (GARTEUR) are presented. The work of this AG, which involved cooperation between research institutes of France, Germany, the United Kingdom, and the Netherlands, was performed with the ultimate aim of establishing handling qualities guidelines for future transport aircraft with advanced flight control and display system. The work of the AG started with the consultation of aircraft industries within the participating countries concerning their opinion on anticipated manual control aspects for future transport aircraft. The underlying report may be regarded as the overall result of the work performed on the basis of this consultation, which resulted in a number of handling qualities guidelines.

N92-28653# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

RESPONSE OF HELICOPTERS TO GUSTS

R. NOBACK 27 Apr. 1990 98 p (Contract RNLAF-RB-KLU-1990/A.5)

(NLR-TP-90159-U; ETN-92-91436) Avail: CASI HC A05/MF A02 Equations to describe the response of helicopters to

Equations to describe the response of helicopters to atmospheric gusts are derived. Results of calculations are compared to results as presented in the literature. The influence of various parameters is investigated, especially that of a mass parameter. Special attention is paid to the response to continuous sinusoidal turbulence.

N92-28801# Naval Postgraduate School, Monterey, CA. STABILITY AND CONTROL FLIGHT TESTING OF A HALF-SCALE PIONEER REMOTELY PILOTED VEHICLE M.S. Thesis

KENT ROBERT AITCHESON Sep. 1991 74 p (AD-A245973) Avail: CASI HC A04/MF A01

Stability and control flight testing was conducted on a half-scale Pioneer remotely piloted vehicle. The aircraft was instrumented with sensors to measure flight control deflections, angle of attack, side slip angle, and airspeed. A developmental telemetry transmitter was installed to send the information to a ground based receiver where it was recorded for computer processing. Flight tests were conducted to characterize longitudinal static stability by varying the center of gravity to determine the neutral point. Directional static stability was characterized using steady heading side slip flight tests. The telemetry system's performance was acceptable and the directional stability data correlated favorably with data gathered from wind tunnel testing and computational methods. Longitudinal stability was more difficult to characterize due to limitations of elevator deflection resolution and the amount of data gathered. Additional flight testing will be conducted to tune the telemetry system with the data collection sensors, and to increase the Pioneer static stability data base.

N92-29654*# Minnesota Univ., Minneapolis. Dept. of Aerospace Engineering and Mechanics.

FEEDBACK CONTROL LAWS FOR HIGHLY MANEUVERABLE AIRCRAFT Interim Report, Jan. - Jul. 1992

WILLIAM L. GARRARD and GARY J. BALAS Jul. 1992 41 p (Contract NAG1-1380)

(NASA-CR-190535; NAS 1.26:190535) Avail: CASI HC A03/MF

The results of a study of the application of H infinity and mu synthesis techniques to the design of feedback control laws for the longitudinal dynamics of the High Angle of Attack Research Vehicle (HARV) are presented. The objective of this study is to develop methods for the design of feedback control laws which cause the closed loop longitudinal dynamics of the HARV to meet handling quality specifications over the entire flight envelope. Control law designs are based on models of the HARV linearized at various flight conditions. The control laws are evaluated by both linear and nonlinear simulations of typical maneuvers. The fixed gain control laws resulting from both the H infinity and mu synthesis techniques result in excellent performance even when the aircraft performs maneuvers in which the system states vary

significantly from their equilibrium design values. Both the H infinity and mu synthesis control laws result in performance which compares favorably with an existing baseline longitudinal control law.

N92-30025*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HELICOPTER LOW-SPEED YAW CONTROL Patent Application JOHN C. WILSON, inventor (to NASA), HENRY L. KELLEY, inventor (to NASA), and CYNTHIA A. CROWELL, inventor (to NASA) (Army Aerostructures Directorate, Hampton, VA.) 7 Nov. 1991 10 p (NASA-CASE-LAR-14219-1; NAS 1.71:LAR-14219-1;

US-PATENT-APPL-SN-788908) Avail: CASI HC A02/MF A01

A system for improving yaw control at low speeds consists of one strake placed on the upper portion of the fuselage facing the retreating rotor blade and another strake placed on the lower portion of the fuselage facing the advancing rotor blade. These strakes spoil the airflow on the helicopter tail boom during hover, low speed flight, and right or left sidewards flight so that less side thrust is required from the tail rotor.

Author

09

RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

A92-44976

REAL-TIME CONTROL TOWER SIMULATION FOR EVALUATION OF AIRPORT SURFACE TRAFFIC AUTOMATION STEVEN R. BUSSOLARI (MIT, Lexington, MA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 502-507. Research sponsored by FAA. refs

High fidelity, real-time aircraft simulation has been a valuable tool for the human factors evaluation of flight deck automation, but no equivalent simulation has been available for the Air Traffic Control Tower (ATCT) environment. The capacity, flexibility, and data collection requirements placed on a research simulation preclude the use of existing tower training systems. Using a network of computer workstations, an ATCT real-time simulation has been developed that is capable of reproducing the traffic environment found at major airports. The simulation will be used for preliminary evaluation of the impact of automation upon tower controller workload and situational awareness.

A92-44981

OPERATIONAL EVALUATION OF A TOWER WORKSTATION FOR CLEARANCE DELIVERY

CHRIS MOODY (Mitre Corp., McLean, VA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 538-543.

At towered airports a function known as clearance delivery exists to provide the initial instrument flight rules (IFR) clearance to departing flights via voice radio. At busy airports the radio frequencies used for this function can become saturated at peak periods. To alleviate this problem the FAA has determined that this clearance information (referred to here as Predeparture Clearance or PDC) will be a service offered via digital data link. The MITRE Corporation has developed an experimental tower workstation system which is used for issuing clearances in digital form. Three such workstations have been operationally evaluated at the Dallas/Ft. Worth, Chicago O'Hare and San Francisco Airports with the cooperation of several participating airlines. This paper describes the experimental system and reports on experiences gained from field operation including results of surveys distributed to pilots and tower controllers using the system. As a result of

positive response from the users, implementation of a national system based on the experimental system is now under way by the FAA.

Author

A92-45025 SIMULATION OF TRIPLE SIMULTANEOUS PARALLEL ILS APPROACHES

TERENCE FISCHER (CTA, Inc., McKee City, NJ) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 830-835. refs

A real-time simulation has been conducted in order to evaluate the efficacy of triple simultaneous parallel ILS approach operations at Dallas/Fort Worth (DFW) international Airport during instrument meteorological conditions. The subjects of the study were five ATC specialists and/or supervisors from DFW. Analysis of the Aircraft Proximity Index and Closest Point of Approach metrics indicated that the triple simultaneous ILS approaches led to miss distances that were statistically equivalent to those in the double simultaneous parallel ILS approaches at DFW.

A92-45026

TOWARD AN INTEGRATED MULTIMODAL APPROACH TO FLIGHT SIMULATION

GARY E. RICCIO (Illinois, University, Urbana) and LAWRENCE J. HETTINGER (Logicon Technical Services, Inc.; Wright State University, Dayton, OH) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 836-840. refs

A comprehensive view of flight simulation must acknowledge that motion cannot be controlled without producing variations in the magnitude and orientation of the velocity vector; this is a multimodal phenomenon with implications for posture control within the cockpit which cannot currently be accounted for in flight simulations. An approach to flight simulation is presented which incorporates velocity vector variations. Attention is given to 'vection', postural control, and simulator sickness.

O.C.

A92-45027

THE DEVELOPMENT OF A REAL TIME VISUAL FLIGHT SIMULATOR FOR TACTICAL OPERATIONS RESEARCH AND MEASUREMENT

JEFF MARESH (Engineering Solutions, Inc., Columbus, OH) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 841-846.

An evaluation is conducted of several technical aspects of the simulation hardware and software employed by the Simulator for Tactical Operations Research and Measurement. Modularity in both hardware and software allowed upgrades to be straightforwardly implemented without wholesale replacement of existing resources. Because the visual scene can be developed on the basis of a CAD package, the volume of the program code that must be developed is significantly reduced.

O.C.

A92-45028

CENTRE FOR FLIGHT SIMULATION BERLIN AIRBUS 340 SIMULATOR FOR RESEARCH AND TRAINING

GERHARD HUETTIG (Berlin, Technische Universitaet, Federal Republic of Germany) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 847-850.

The Center for Flight Simulation Berlin employs an IBM 6000 computer identical to that used in the A 340 airliner's training simulator for simulation system-related research, and will employ The Interactive Graphics Environment for Real Time Systems software package for graphics-display development efforts. Investigations will be conducted in the fields of crew ergonomics and human factors effects on crew performance, air-ground communications based on the Mode S data link, flight guidance and control, and crew-training concepts.

A92-45042

FULL MODEL SIMULATION OF THE NATIONAL AIRSPACE SYSTEM - RESEARCH AND TRAINING PLATFORM

GERALD D. GIBB (Embry-Riddle Aeronautical University, Daytona Beach, FL) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 935-938.

U.S. ATC system modernization has prompted the formulation of requirements for a highly integrated training system which, in addition to yielding ATC personnel proficiency, will furnish a research platform which emulates the flight environment with the requisite fidelity and a testbed for investigation of the effects of proposed ATC task changes before operational implementation. A simulation platform configuration prototype has been devised whose software is written in FORTRAN and 'C'; the control/display hardware is a Personal Iris 4-D workstation.

A92-45096

THE DAM VERTICAL SHOCK-TUBE (LE TUBE A CHOC VERTICAL DE LA DAM)

C. CAVAILLER, H. CROSO (CEA, Centre d'Etudes de Vaujours-Moronvilliers, Courtry, France), J. F. HAAS, and G. RODRIGUEZ (CEA, Centre d'Etudes de Limeil-Valenton, Villeneuve-Saint-Georges, France) CHOCS (ISSN 1157-741X), no. 2, June 1991, p. 70-88. In French. refs Copyright

A vertical shock tube is described that can be used to study flow phenomena, and experimental results from the device are given and compared to theory. Following a brief theoretical discussion of flow phenomena in general treatment is given to the effects of initial defect geometries, flow speed, and diffuse vs membrane interfaces. The double-diaphragm shock tube is then described with illustrations of the separation between the high-and low-pressure chambers. The spatiotemporal operation of the device is discussed, and the experimental diagnostics include measurements of shock speed and flow visualization. The shock tube is shown to provide experimental results describing flow phenomena with zones of diffusion and with thin membranes. Results are compared with those derived from K-epsilon flow models, and good general agreement is noted.

C.C.S.

A92-45265* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ON THE MEASUREMENT OF SUBSONIC FLOW AROUND AN APPENDED BODY OF REVOLUTION AT CRYOGENIC CONDITIONS IN THE NTF

DAVID W. CODER (U.S. Navy, David W. Taylor Research Center, Bethesda, MD), S. G. FLECHNER, and J. B. PETERSON, JR. (NASA, Langley Research Center, Hampton, VA) IN: High Reynolds number flows using liquid and gaseous helium. New York, Springer-Verlag, 1991, p. 105-124. Research sponsored by U.S. Navy and DARPA. refs Copyright

Fluid mechanics scaling is briefly reviewed and testing ship models at high Reynolds numbers in the National Transonic Facility is discussed. Particular attention is given to the 1986 body of revolution experiment, the expanded model capabilities for a future body of revolution experiment, major features of a future flat plate experiment, the proposed liquid helium tunnel from the user's point of view, and a comparison of the NTF and the Conceptual Helium Tunnel.

O.G.

A92-45266* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA. WATER TUNNELS

LISA J. BJARKE (NASA, Flight Research Center, Edwards, CA) IN: High Reynolds number flows using liquid and gaseous helium. New York, Springer-Verlag, 1991, p. 125-130. refs Copyright

Some of the uses of water tunnels are demonstrated through the description of the NASA Ames-Dryden Flow Visualization Facility. It is concluded that water tunnels are capable of providing

a quick and inexpensive means of flow visualization and can aid in the understanding of complex fluid mechanics phenomena.

O.G.

A92-45267

REMARKS ON HIGH-REYNOLDS-NUMBER TURBULENCE **EXPERIMENTS AND FACILITIES**

K. R. SREENIVASAN (Yale University, New Haven, CT) IN: High Reynolds number flows using liquid and gaseous helium. New York, Springer-Verlag, 1991, p. 181-184. refs Copyright

Remarks made at the Seventh Oregon Conference on Low Temperature Physics on the need for research high-Reynolds-number turbulence and the possibility of using a helium tunnel for the purpose are summarized. It is argued that, if the perspective of turbulence studies is ignored, it is clear that helium tunnels can extend the Reynolds number range accessible to most experimentalists. In particular, if they can be built without extraordinary expense so as to be accessible also to the university community, they acquire an added value.

A92-45275

POWER ECONOMY IN HIGH-SPEED WIND TUNNELS BY CHOICE OF WORKING FLUID AND TEMPERATURE

IN: High Reynolds number flows using liquid RONALD SMELT and gaseous helium. New York, Springer-Verlag, 1991, p. 265-284. refs

Copyright

Possible methods of making very high reductions in the power required for high-speed wind tunnels at fixed Mach number, Reynolds number, and pressure, which are based on new working substances or low temperatures, are discussed. It is found that, for operation at normal temperatures, best power economy can be obtained by using certain fluorine compounds of high molecular weight (SF6, SeF6, and TeF6); the power required is only 1 to 2 percent of that of a similar tunnel using atmospheric air.

A92-45314 RECENT DEVELOPMENTS AT THE SHOEBURYNESS STOVL TEST FACILITY

L. H. K. REED (Rolls-Royce, PLC, Bristol, England) International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.2.1-III.2.8. Research supported by Rolls-Royce, PLC and Ministry of Defence of England. Previously announced in STAR as N92-22096.

Copyright

The last two years have seen a number of test programs performed that are directly targeted at the technology acquisition need for the next generation of STOVL (Short Take Off Vertical Landing) fighter aircraft. The facilities used comprise a dynamic test gantry with airframe and two augmented powerplants allowing operation in ground effect to be simulated at full scale over a wide range of jet energies and configurations. The areas of concern in the ground environment of a STOVL vehicle are described. together with how the current test programs are acquiring the knowledge to give confidence that the design solution will be satisfactory. Author

A92-45323

GROUND SURFACE EROSION - BRITISH AEROSPACE TEST FACILITY AND EXPERIMENTAL STUDIES

ALISON J. WAKE, C. J. HILL (British Aerospace / Military Aircraft/, Ltd., Preston, England), and R. G. A. ANGEL (British Aerospace /Military Aircraft/, Ltd., Kingston-upon-Thames, England) International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings. London, Royal Aeronautical Society, 1990, p. III.11.1-III.11.11. refs

Copyright

ASTOVL combat aircraft studies of the erosion of the landing surface during vertical lift operation are discussed. Attention is given to a facility commission at British Aerospace, with emphasis on the laboratory, vented via roof and wall louvres; the ground erosion rig, consisting of a combustion chamber, support tower and linear motor track; and the valve house, including the air and fuel systems. The facility is capable of producing jet pressure ratios from 1.1 to 10 with both quiescent, and from 450 to 1500 K, exhaust temperatures. Current studies are aimed at a precise definition of operational limitations of surfaces presently used by Harrier including the implications of rolling/creeping landing. Results of investigations of the implications of test techniques and assumptions used are presented.

A92-45380

ENHANCEMENT OF GROUND HANDLING THROUGH OPTIMUM SELECTION/USE OF GROUND SUPPORT **EQUIPMENT (GSE)**

PAUL D. TUCK IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 75-89. refs (SAE PAPER 911973) Copyright

The USAF has undertaken a search for prototype GSE aircraft loader which can service a range of cargo aircraft defined by the C-130 at one extreme and the B747 at the other. It is presently shown that a family of cargo on/off-loaders which is capable of simultaneously servicing a transport aircraft's main and lower cabin lobes is both more operationally efficient and more cost-effective than a single, 'Cadillac-type' Super Loader. The loader in question must meet demanding air-transportability requirements.

A92-45388

THE LARGE SCALE TEST CONTROL SYSTEMS DESIGNED AND BUILT BY THE BOEING COMPANY TO SUPPORT THE 757 AND 767 MAJOR FATIGUE TESTS

STEVEN A. ONUSTACK (Boeing Co., Seattle, WA) International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 179-190.

(SAE PAPER 911985) Copyright

This paper describes the hardware and software that were designed, developed, and built to support major fatigue testing of full-scale 757 and 767 airframes. These test control systems resulted in significant cost savings over previous programs. These systems are capable of applying pseudorandom loading of complex flight load spectrums with up to 72 channels of control and 110 channels of data acquisition. The major fatigue tests consisted of the application of two normal lifetimes of flights in a test environment that is performed on the ground with loads applied by closed loop servohydraulic load control systems.

A92-45422

FUNCTIONAL MOCK-UP TESTS FOR FLIGHT CONTROL SYSTEM OF THE NAL QSTOL RESEARCH AIRCRAFT 'ASKA'

AKIRA TADA, TADAO UCHIDA, TOSHIO OGAWA, NORIAKI OKADA (National Aerospace Laboratory, Chofu, Japan), ISOROKU UCIKAWA (Kawasaki Heavy Industries, Ltd., Gifu, Japan), HIDEYUKI YAMATO (Tokyo, University, Japan), and YASURO TAKEUCHI (Shinmeiwa Industries Co., Ltd., Hyogo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 525-534. refs

(SAE PAPER 912036) Copyright

Control system functional mockup tests were conducted with ASKA, a quiet STOL (QSTOL) aircraft to examine the system's overall control functions using hardware-in-the-loop. Simulation was effectively simplified by omitting the control system right-half side and shortening the system's straight sections. All test measurements were precisely taken, and a 'filtering sampler'. an antialiasing technique/device, was designed and employed for digital data acquisition.

A92-46780

CALIBRATION-RELATED PSEUDO-REYNOLDS NUMBER TRENDS IN TRANSONIC WIND TUNNELS

FELIX AULEHLA (MBB GmbH, Munich, Federal Republic of Germany) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 545-552. Previously cited in issue 21, p. 3354, Accession no. A87-49111. refs
Copyright

A92-47303

STRENGTH EVALUATION AND SAFETY OF MACHINE/STRUCTURE. III - CASE EXAMPLES ON STRENGTH AND SAFETY EVALUATION OF MACHINE/STRUCTURE 3.2 AIRCRAFT (AIRFRAME)

S. MIYAKE Japan Society of Materials Science, Journal (ISSN 0514-5163), vol. 41, no. 464, May 1992, p. 777-783. In Japanese. refs
Copyright

A92-47365

GAS TURBINE EXHAUST SYSTEM SILENCING DESIGN

R. B. TATGE and DINCER OZGUR (General Electric Co., Schenectady, NY) IN: NOISE-CON 91; Proceedings of the 11th National Conference on Noise Control Engineering, Tarrytown, NY, July 14-16, 1991. Poughkeepsie, NY, Noise Control Foundation, 1991, p. 223-230. refs Copyright

The analysis and design of silencing systems are discussed for applications in the exhaust systems of gas turbines to reduce duct-exit and breakout noise. The calculation of transmission loss (TL) for a given silencer is explained, and the computation of duct-wall sound TL is mentioned. The analysis is based on the theories of Kurze (1969) and Sharp (1978) for determining sound TLs for the silencers and ductwork and therefore general sound levels. The analytical methods for TL are used for comparisons with measured values from a gas turbine configuration with silencers. Attention is given to the calculated and measured values for breakout noise at 3 ft from the duct, the sound level in the plane of the exhaust exit, and the sound level at 400 ft. The acoustical properties of the silencer and ductwork at elevated temperatures can be determined by scaling the flow resistance of materials as the gas viscosity.

C.C.S.

A92-47522

REAL TIME PRESENTATION FOR RAFALE IN-FLIGHT TESTS

PHILLIPPE PATUREAU (Dassault Aviation, Vaucresson, France) and DOUGLAS ULLAH (Loral Instrumentation, San Diego, CA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 303-321. Copyright

The new telemetry equipment installed at Dassault Aviation for monitoring RAFALE D C01 in-flight tests is described. The discussion covers a brief history of the development of the company's real time display resources and the principles underlying the selection and design of these resourses. In particular, attention is given to displays from a decommutator, computer generated displays, and System 500 instrumentation, software, and workstation. Finally, some planned improvement in the real-time telemetry system are discussed.

A92-47562

REMOTE TELEMETRY CONCEPTS

R. STIERS (Boeing Commercial Airplane Group, Seattle, WA) and T. LYDON (Veda, Inc., Arlington, VA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 717-724. Copyright

A Remote Telemetry Station (RTS) was developed to support a flight-test telemetry range. As requirements to relocate the test range were investigated various approaches were evaluated. The RTS is capable of supporting many sites, tracking and receiving

up to 1024 Kbits/sec of telemetry data, providing fully redundant two-way radio communication in the UHF and VHF bands, linking all the data, and appearing transparent to the users. The system meets all requirements in a highly integrated efficient flexible package.

Author

A92-47567

GULF RANGE DRONE CONTROL UPGRADE SYSTEM MOBILE CONTROL SYSTEM

STEVEN M. WAGNER (USAF, Eglin AFB, FL) and JOHN H. GOODSON (General Electric Government Services, Inc., Range Projects Div., Eglin AFB, FL) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 751-758. refs Copyright

This paper describes the development and assembly of the Gulf Range Drone Control Upgrade System (GRDCUS) Mobile Control System (GMCS) van and focuses on the on-board computer systems, consoles, and data link technology. An overall system engineering approach was used during GMCS development and is highlighted through the use of rapid prototyping. This methodology and the lessons learned are presented in the paper.

A92-47584

DESIGN CONSIDERATIONS FOR A MODERN TELEMETRY PROCESSING AND DISPLAY SYSTEM

PAUL D. KNIGHT (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 911-923.

Copyright

This paper delineates some design considerations that allow a system designer to adapt or modify a telemetry processing and design system as required in order to stay abreast of constantly changing telemetry requirements. A description of how these design considerations were used implementing a telemetry processing system is presented.

Author

A92-48600

NEW HYPERSONIC TEST METHODS DEVELOPED AT ONERA - THE R5 AND F4 WIND TUNNELS [NOUVEAUX MOYENS D'ESSAIS HYPERSONIQUES DEVELOPPES A L'ONERA - LES SOUFFLERIES R5 ET F4]

B. CHANETZ, M.-C. COET, D. NICOUT, T. POT, P. BROUSSAUD, G. FRANCOIS, A. MASSON (ONERA, Chatillon, France), and D. VENNEMANN (ESA/CNES Joint Group, Toulouse, France) (NATO, AGARD, Symposium on Theoretical and Experimental Methods in Hypersonic Flows, Turin, Italy, May 4-8, 1992) ONERA, TP no. 1992-39, 1992, 13 p. In French. refs (ONERA, TP NO. 1992-39)

The R5 wind tunnel allows the simulation of hypersonic flows at low Reynolds numbers, corresponding to intake conditions encountered at altitudes of about 60 km. The F4 wind tunnel is projected to study the effects of actual gas and especially effects associated with chemical kinetics during atmospheric reentry. Attention is given to the performance, installation details and description of the introduction of wind tunnel testing.

A92-48881#

EXPERIENCE IN THE OPERATION OF A HYPERSONIC NOZZLE STATIC THRUST STAND

KEVIN L. MIKKELSEN and JULIAN J. IDZOREK (FluiDyne Engineering Corp., Minneapolis, MN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 26 p. refs

(AIAA PAPER 92-3292) Copyright

The testing of exhaust nozzles with high area ratios in a static thrust stand is described focusing on the results of testing for the NASP generic option nozzle. Improvements to the testing techniques and operational methodology are described with

reference to improvements in the collected data. The static thrust stand for hypersonic nozzles is designed to measure flow and thrust coefficients, surface pressures, and heat flux in the nozzles while examining the effects of air liquefaction. The facility uses a single-component load cell to alleviate large moments without interfering with the force balance. Real-gas correction factors are incorporated into the testing to cover increased ranges of pressures and temperatures. The testing methodology is shown to provide data with a significant reduction in scatter with respect to nozzle thrust.

National Aeronautics and Space Administration. A92-48908*# Lewis Research Center, Cleveland, OH.

INVESTIGATION OF THREE-DIMENSIONAL FLOW FIELD IN A TURBINE INCLUDING ROTOR/STATOR INTERACTION. I -DESIGN DEVELOPMENT AND PERFORMANCE OF THE **RESEARCH FACILITY**

B. LAKSHMINARAYANA, C. CAMCI (Pennsylvania State University, University Park), I. HALLIWELL (GE Aircraft Engines, Cincinnati, OH), and M. ZACCARIA (Pennsylvania State University, University Park) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. Research supported by Pennsylvania State University. refs (Contract DAAL03-86-G-0013; NSG-3555)

(AIAA PAPER 92-3325) Copyright

A description of the Axial Flow Turbine Research Facility (AFTRF) installed at the Turbomachinery Laboratory of the Pennsylvania State University is presented in this paper. The facility diameter is 91.66 cm (3 feet) and the hub-to-tip ratio of the blading is 0.73. The flow path consists of turbulence generating grid, 23 nozzle vane and 29 rotor blades followed by outlet guide vanes. The blading design, carried out by General Electric Company personnel, embody modern HP turbine design philosophy, loading and flow coefficient, reaction, aspect ratio, and blade turning angles: all within the current aircraft engine design turbine practice. State-of-the-art quasi-3D blade design techniques were used to design the vane and the blade shapes. The vanes and blades are heavily instrumented with fast response pressure, shear stress, and velocity probes and have provision for flow visualization and laser Doppler anemometer measurement. Furthermore, provision has been made for detailed nozzle wake, rotor wake and boundary layer surveys. A 150 channel slip ring unit is used for transmitting the rotor data to a stationary instrumentation system. All the design objectives have been met.

N92-28248# Chemical Research and Development Center, Aberdeen Proving Ground, MD.

EXPERIMENTAL AERODYNAMIC FACILITIES OF THE **AERODYNAMICS RESEARCH AND CONCEPTS ASSISTANCE** BRANCH Final Report, Jan. - Feb. 1992 MILES C. MILLER Feb. 1992 28 p

(AD-A247489; CRDEC-TR-309) Avail: CASI HC A03/MF A01

This report is intended to acquaint researchers within the Department of Defense and approved U.S. Government contractors with the experimental aerodynamic facilities currently in use at the U.S. Army Chemical Research, Development and Engineering Center.

N92-28388# Arizona Univ., Tucson. Coll. of Engineering and

EXPAND TURBULENCE LABORATORY FACILITIES TO MEET NEW DOD RESEARCH INTEREST Final Technical Report, 1 Oct. 1986 - 30 Sep. 1991

FRANK H. CHAMPAGNE 6 Mar. 1992 6 p (Contract AF-AFOSR-0004-87)

(AD-A248581; AFOSR-92-0259TR) Avail: CASI HC A02/MF A01

The expansion of our turbulence laboratory facility funded by this DOD-URI award is complete. Two new test sections and a translator have been acquired for our wind tunnel. The new translator is specially designed to permit measurement of three-dimensional wakes with a minimum of blockage. Fortlier, our MASSCOMP 500 series laboratory computer, was PRP upgraded to a 32-bit machine.

N92-28407# Naval Aerospace Medical Research Lab., Pensacola.

USE OF A COMMERCIALLY AVAILABLE FLIGHT SIMULATOR **DURING AIRCREW PERFORMANCE TESTING Final Report** SCOTT A. SHAPPELL and BRADY J. BARTOSH 21 p

(AD-A245922; NAMRL-TM-91-2) Avail: CASI HC A03/MF A01

Investigations of aircrew sustained operations (SUSOPS) have been criticized for employing tasks with no apparent external validity. Because measures obtained directly from aviators flying high-performance aircraft are difficult to obtain, a laboratory compromise is needed. High-fidelity flight simulators used for aircrew training offer the most realistic simulation, but their availability is limited. Personal computer-based flight simulators may provide adequate simulation in the laboratory at a reasonable cost. This report describes a representative research protocol using a commercially available flight simulator during a simulated aircrew

N92-28523# Federal Ministry for Defence, Bonn (Germany, F.R.). Armaments Technology Directorate.

OPPORTUNITIES FOR FLIGHT SIMULATION TO IMPROVE **OPERATIONAL EFFECTIVENESS**

J. HEYDEN In AGARD, Piloted Simulation Effectiveness 15 p. Feb. 1992

Copyright Avail: CASI HC A03/MF A03

The keynote address gives an overview over the opportunities of piloted simulation for the development of aircraft and for the training of aircrews to operate the aircraft. Based on the military flight mission requirements some critical issues of peacetime military operations in Europe are discussed and the resulting opportunities for application of flight simulation in development and training are presented. The address concludes on recommendations for piloted simulation. Author

N92-28524# Wright Lab., Wright-Patterson AFB, OH. Flight Dynamics Directorate.

PILOTED SIMULATION EFFECTIVENESS DEVELOPMENT **APPLICATIONS AND LIMITATIONS**

RICHARD A. BOROWSKI In AGARD, Piloted Simulation Effectiveness 3 p Feb. 1992

Copyright Avail: CASI HC A01/MF A03

The author of this brief note begins by describing how flight simulators were first developed, and the reasons that brought about this research. The remainder of his paper is a survey of some simulation systems used in the U.S. with the recognition that similar and in some cases superior systems exist elsewhere. Concentration is placed on simulators run by the government, the military, and NASA.

N92-28525# Air Force Flight Test Center, Edwards AFB, CA. UTILITY OF GROUND SIMULATION IN FLIGHT CONTROL PROBLEM IDENTIFICATION, SOLUTION DEVELOPMENT, AND **VERIFICATION**

K. L. KELLER, D. B. JANZEN, and A. A. ASAY In AGARD, Piloted Simulation Effectiveness 8 p Feb. 1992 Copyright Avail: CASI HC A02/MF A03

The Air Force Flight Test Center (AFFTC) Flying Qualities Simulator is consistently used prior to and in conjunction with flight test to identify aircraft flight control problems and also to develop, test, and validate solutions to these problems. The subject of this paper is an example of how ground simulation was vital in developing an effective software modification to eliminate a potentially dangerous aircraft flight control anomaly. Through simulation, an in flight uncommanded pitch oscillation incident was investigated and the source of the problem was identified. A potential solution was tested and validated by utilizing the simulator prior to flight test. Additional benefits were gained due to simulation studies. The project pilots were able to practice test maneuvers and emergency procedures essential to the flight test program. The preliminary work accomplished by ground simulation correctly predicted the effectiveness of the software modifications and ensured the success of an efficient and valid flight test program.

Author

N92-28526# Aerospatiale, Toulouse (France).

FLIGHT SIMULATION AND DIGITAL FLIGHT CONTROLS

D. CHATRENET In AGARD, Piloted Simulation Effectiveness 4 p Feb. 1992

Copyright Avail: CASI HC A01/MF A03

The A-320 is the first civil airliner to make extensive use of digital flight controls. Despite previous experience with this technology, developing this system quickly has proven a challenge. Flight simulation with a high degree of fidelity has played a key role in flight control development. Simulation has also complemented the flight testing of the A-320-200. Digital flight control has moved the critical areas from aerodynamic model accuracy to flight control system representation exactness. Simulator acceptance procedures had also to be adapted to address the case of closed loop controlled aircraft correctly.

Author

N92-28527# McDonnell-Douglas Helicopter Co., Mesa, AZ. Flight Mechanics/Performance Dept.

THE APPLICATION OF FLIGHT SIMULATION MODELS IN SUPPORT OF ROTORCRAFT DESIGN AND DEVELOPMENT

P. SHANTHAKUMARAN In AGARD, Piloted Simulation Effectiveness 28 p Feb. 1992

Copyright Avail: CASI HC A03/MF A03

McDonnell Douglas Helicopter Company's overall approach to design development and flight evaluation through flight simulation models is presented. Flight simulation model description, validation against flight test data bases, and applications for rotorcraft design and development, are presented. Specific model refinements for each application are emphasized. Examples include power-off emergency landing, empennage design, maneuver envelope expansion, engine-airframe integration, and manned simulations.

Author

N92-28528# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Helicopter Div.

EXPERIENCE WITH PILOTED SIMULATION IN THE DEVELOPMENT OF HELICOPTERS

M. OBERMAYER, K. KAMPA, W. DOEHNEL, and A. FAULKNER In AGARD, Piloted Simulation Effectiveness 11 p Feb. 1992 Copyright Avail: CASI HC A03/MF A03

Based on examples from several projects this paper reflects MBB's experience with applicability, limitations, acceptance, and effectiveness of helicopter simulation. Some of the key points are the objective and subjective validation of a simulator and various factors, which influence the acceptance by pilots. In this context it is very important to make a trade-off between simulator sophistication and required results. Other aspects of simulation effectiveness include evaluation and training of critical flight conditions prior to flight tests as well as involving the customer from early concept studies up to full mission simulations, which gives him more influence on the design and leads to better identification with the product.

N92-28532# National Aerospace Lab., Amsterdam (Netherlands).

AIRCRAFT SIMULATION AND PILOT PROFICIENCY: FROM SURROGATE FLYING TOWARDS EFFECTIVE TRAINING

P. G. A. M. JORNA (National Aerospace Lab., Amsterdam (Netherlands).), E. R. A. VANKLEEF (Royal Netherlands Air Force, The Hague.), and W. P. DEBOER *In* AGARD, Piloted Simulation Effectiveness 8 p Feb. 1992

Copyright Avail: CASI HC A02/MF A03

Simulators are currently built as simple system 'look-a-likes' and a structured or experimentally validated approach to their use and implementation as part of a comprehensive training system is lacking. This is one reason why their use in training was not always as successful as expected. This paper reviews some experiences with the application of simulators in military flight training and it reports research strategies like the development of

objective performance measures in support of validation trials and future simulator development. It is proposed to prototype simulator concepts before implementing them and relevant research initiatives in this area are reviewed.

Author

N92-28533# CAE Electronics Ltd., Montreal (Quebec). Tactical Systems Div.

THE USE OF A DEDICATED TESTBED TO EVALUATE SIMULATOR TRAINING EFFECTIVENESS

DAVID KURTS (CAE Electronics Ltd., Montreal (Quebec).) and CHARLES GAINER (Army Research Inst. Aviation Research and Development Activity, Fort Rucker, AL.) /n AGARD, Piloted Simulation Effectiveness 9 p Feb. 1992
Copyright Avail: CASI HC A02/MF A03

The Simulator Complexity Test Bed (SCTB) is being produced for the U. S. Army Research Institute Aviation Research and Development Activity (ARIARDA) to specifically address the question of the level of simulation fidelity required to ensure adequate transfer of training in a tactical helicopter simulator environment. This paper presents the objectives of the SCTB, the hardware and software architecture designed to facilitate these goals, and presents examples of some typical research that will be conducted. The simulator is based on the Apache AH-64A attack helicopter using aircraft parts and simulated avionics to provide a realistic replica of the pilot and copilot gunner positions.

N92-28535# Air Force Flight Test Center, Edwards AFB, CA. Test and Evaluation Simulator.

USE OF SIMULATION IN THE USAF TEST PILOT SCHOOL CURRICULUM

DANIEL P. RINGENBACH (NSI Technology Services Corp., Greenbelt, MD.), STEVEN E. LOUTON (NSI Technology Services Corp., Research Triangle Park, NC.), and DANIEL GLEASON *In* AGARD, Piloted Simulation Effectiveness 7 p Feb. 1992 Copyright Avail: CASI HC A02/MF A03

The six degree-of-freedom, real time, Test Pilot School (TPS) simulator at the Test and Evaluation Mission Simulator (TEMS) of the Air Force Flight Test Center (AFFTC) is an invaluable and versatile tool used by the TPS. It is an effective learning tool providing positive reinforcement on basic aircraft dynamics taught in the classroom and an efficient evaluation tool for flight control systems designed by the students.

N92-28536# Alenia, Torino (Italy). Flight Simulation Center. AM-X FLIGHT SIMULATOR FROM ENGINEERING TOOL TO TRAINING DEVICE

A. ARMANDO, P. CASTOLDI, and F. FASSI /n AGARD, Piloted Simulation Effectiveness 12 p Feb. 1992
Copyright Avail: CASI HC A03/MF A03

Effectiveness of Flight Simulation with pilot-in-the-loop can be intended rather differently depending on the context in which the simulation activities are carried out, namely in the two traditional areas of Research & Development (R&D) and Training. In the latter case, effectiveness can be considered the amount of training a simulator is able to transfer per time unit, while in the case of R&D simulation its effectiveness is related to the amount of confidence engineers can gain in the prediction of an airborne system behavior before releasing it to the real flight. Pursuing the maximization of effectiveness in these two different contexts leads to different approaches in applying simulation methodologies. This paper will show to what extent a simulation facility created and continuously improved to support the development of a new attack aircraft, the AM-X, was finally capable of training operational pilots during the conversion to that aircraft.

N92-28537# Sikorsky Aircraft, Stratford, CT.
FULL MISSION SIMULATION: A VIEW INTO THE FUTURE
MICHAEL J. FERRANTI and STEPHEN H. SILDER, JR. In AGARD,
Piloted Simulation Effectiveness 10 p Feb. 1992
Copyright Avail: CASI HC A02/MF A03

The use of engineering simulation as a design support tool is becoming more prevalent in assisting design engineers in

prototyping new concepts in advanced integrated helicopters. The primary goal in using full mission simulation as a risk reduction tool is that it can provide significant insight into critical design areas. In this capacity, it allows the research engineer the means to review critical design issues and assess areas of high risk associated with air vehicle design. The use of the Engineering Development Full Mission Flight Simulator (EDFMFS) will allow the design engineers the opportunity to view the future performance of the design air vehicle. This includes areas of both aerodynamic and operational suitability. The use of representative flight simulators will allow major design issues to be resolved with a significant reduction in the cost normally associated with developmental flight testing. The performance of flight control laws and cockpit design can be evaluated in the safe and secure environment of the simulator before actual flight test. In this regard, the capabilities of EDFMFS's have shown themselves to be an outstanding tool in evaluating advanced design aircraft during the initial design phase. Today's use of statistical and multivarient analysis techniques provides the designers with a real time quantitative capability to collect and analyze data, thus, reducing the risk associated with new product development. The methodologies used that provide the designer and pilots with the unique opportunity to evaluate different aircraft configurations in the Full Mission Flight Simulator before the design is concluded are identified.

N92-28539# CAE Electronics Ltd., Saint Laurent (Quebec). THE EVALUATION OF SIMULATOR EFFECTIVENESS FOR THE TRAINING OF HIGH SPEED, LOW LEVEL, TACTICAL FLIGHT OPERATIONS

ANDREW MORRIS (CAE Electronics Ltd., Montreal (Quebec).) and PAUL E. VANHEMEL (CAE-Link Corp., Alexandria, VA.) /n AGARD, Piloted Simulation Effectiveness 11 p Feb. 1992 Copyright Avail: CASI HC A03/MF A03

The German Government has initiated a three phase program to evaluate the use of an improved simulator for the Tornado aircraft. In the first phase of this program computer aided engineering (CAE) has built a prototype simulator, referred to as the Evaluation Unit (EU). The improvements in the EU consist of visual system upgrades to provide a CAE Fiber-Optic Helmet Mounted Display (FOHMD) for the pilot and weapon system officer (WSO), with imagery from an Evans & Sutherland ESIG-1000 image generator, as well as a six-degree of freedom (DOF) motion system. The EU was installed at CAE Electronics GmbH in Stolberg, Germany. Military and industrial representatives are conducting an evaluation of the upgraded simulator to assess its capability to provide high speed, low level, tactical flight operations training capability. A factorial analysis of variance (ANOVA) design is being used to objectively assess recorded performance data and subjective impressions data collected during simulator flights by military crews from the German Air Force and Navy. Author

N92-28540# Ministry of Defence, London (England). HARRIER GR MK 5/7 MISSION SIMULATORS FOR THE ROYAL AIR FORCE

B. R. CLIFFORD (Ministry of Defence, London (England).) and P. JACKSON (Link-Miles, Lancing, England) // AGARD, Piloted Simulation Effectiveness 6 p Feb. 1992 Copyright Avail: CASI HC A02/MF A03

IN 1985, in anticipation of the phased replacement of the Harrier GR MK 3 by the Harrier GR MK 5, the UK version of the AV8B, the UK Air Staff issued a requirement for two mission simulators capable of fulfilling a comprehensive pilot training and evaluation task. It identified the need for simulators which would provide a wide range of psycho-physical cues with accurate flight and systems simulation, integrated with a high resolution, wide field-of-view visual system compatible with the Harrier's operational roles and inherent speed and agility. It became apparent that this would require the utilization of new technology, particularly in the area of head and eye-slaved visual displays; studies within the MoD confirm this and conclude that although innovative, the application of such technology was feasible. Some of the background and selection

process are reviewed, and the mission simulators selected to meet the Royal Air Force's training needs are briefly described.

Author

N92-28543# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

USE OF A RESEARCH SIMULATOR FOR THE DEVELOPMENT OF NEW CONCEPTS OF FLIGHT CONTROL [UTILISATION D'UN SIMULATEUR DE RECHERCHE POUR LE DEVELOPPEMENT DE NOUVEAUX CONCEPTS DE COMMANDES DE VOL]

PH. GUICHETEAU In AGARD, Piloted Simulation Effectiveness 11 p Feb. 1992 In FRENCH; ENGLISH summary Copyright Avail: CASI HC A03/MF A03

Several studies performed at ONERA have shown the usefulness of testing the behavior of the whole aircraft with the pilot in the loop by using a research flight simulator as soon as the preliminary design of new FCE for future aircraft is undertaken. The communication presents three conceptual studies related to mission oriented control systems which were performed at ONERA's research flight facility. The description of the conceptual phase of each of these studies and, for two of them, of their further validation on full flight simulators allows a conclusion about the complementary roles of research and full flight simulators.

Author

N92-28544# Dassault-Breguet Aviation, Saint Cloud (France). THE ROLE OF SIMULATION FOR THE STUDY OF APIS (PILOTING SUPPORT BY SYNTHETIC IMAGERY) [LE ROLE DE LA SIMULATION POUR L'ETUDE APIS (AIDE AU PILOTAGE PAR IMAGERIE SYNTHETIQUE)]

PIERRE LARROQUE, PIERRE PAGNIEZ, and ROLAND MIGINIAC *In* AGARD, Piloted Simulation Effectiveness 12 p Feb. 1992 In FRENCH

Copyright Avail: CASI HC A03/MF A03

This report presents different methods of simulation used at Dassault Aviation for the APIS (pilot support by synthetic imagery) study. The aim of this study was to define man-machine concepts for synthetic imagery derived from onboard information and updated in flight. The imagery system provides the pilot with a comprehension and decision tool that can be used for any flight conditions (low altitude, poor visibility...) and tactical conditions. This document describes: (1) the methods used to produce static images from needs analysis, enabling a preliminary selection of acceptable images: (2) the use of workstations to generate and pilot in real time the solutions retained and to improve the representations; (3) interfacing workstations with a real-time processor and a RAFALE type simulation cabin, permitting manual or automatic execution of a 3-D trajectory in a simple scenario and used after evaluation by 10 pilots; (4) scenarios retained and results obtained as a result of these evaluations; and (5) follow up future spinoffs for the engineering of Dassault fighter aircraft. Transl. by L.B.

N92-28545*# Systems Technology, Inc., Hawthorne, CA. THE USE OF GROUND BASED SIMULATION FOR HANDLING QUALITIES RESEARCH: A NEW ASSESSMENT

DAVID G. MITCHELL (Systems Technology, Inc., Hawthorne, CA.), ROGER H. HOH (Hoh Aeronautics, Inc., Lomita, CA.), ADOLPH ATENCIO, JR. (Army Aviation Systems Command, Moffett Field, CA.), and DAVID L. KEY (Army Aviation Systems Command, Moffett Field, CA.) In AGARD, Piloted Simulation Effectiveness 14 p Feb. 1992

(Contract NAS2-13127)

Copyright Avail: CASI HC A03/MF A03

A study was conducted on the NASA Ames Research Center's Vertical Motion Simulator to determine the effects of simulator characteristics on perceived handling characteristics. Differences in pilot opinion were found as the visual and motion parameters were changed, reflecting a change in the pilots' perceptions of handling qualities, rather than changes in the aircraft model itself. The results indicate a need for tailoring the motion without dynamics to suit the task, with reduced washouts for precision maneuvering

as compared to aggressive maneuvering. Visual delay data are inconclusive, but suggest that it may be better to allow some time delay in the visual path to minimize the mismatch between vision and motion, rather than eliminate the visual delay entirely through lead compensation. The simulation results are compared with ratings from a similar in-flight simulation experiment.

N92-28546# Defence Research Agency, Bedford (England). Flight Systems Dept.

INITIAL VALIDATION OF A R/D SIMULATOR WITH LARGE AMPLITUDE MOTION

A. D. WHITE, J. R. HALL, and B. N. TOMLINSON In AGARD, Piloted Simulation Effectiveness 24 p Feb. 1992 Copyright Avail: CASI HC A03/MF A03

The Advanced Flight Simulator (AFS) Complex at the Defense Research Agency (DRA) at Bedford was enhanced by the addition of a large displacement motion platform and a three channel Computer Generated Image (CGI) outside world visual system. The trial described here was the first in a series of trials aimed at validating the AFS in its present configuration and in particular at demonstrating its ability to address a wide variety of vehicle handling qualities with a high degree of fidelity and user confidence. It included a direct comparison between the ground based AFS and the Calspan Learjet in-flight simulator. The comparison between the AFS and Learjet involved three pilots flying the same offset approach landing tasks using the same aircraft model in both the AFS and in flight. The lateral handling qualities were varied by adjusting the time constant of a filter in the pilot's roll control loop. Pilot comments, handling quality, and PIO ratings indicate that the AFS reproduces the lateral handling qualities and roll PIO tendencies of the Learjet in-flight simulator with high fidelity. The degradation in handling qualities and increase in PIO tendencies with increasing filter time constant were clearly revealed in both the AFS and Learjet. The importance of good platform motion cueing and task design when evaluating handling qualities was also demonstrated.

N92-28547# Deutsche Airbus G.m.b.H., Hamburg (Germany, F.R.).

USE OF A VIRTUAL COCKPIT FOR THE DEVELOPMENT OF A FUTURE TRANSPORT AIRCRAFT

DIETER KRICKE and WILFRIED QUELLMANN In AGARD, Piloted Simulation Effectiveness 10 p Feb. 1992 Sponsored in part by BMFT and Council of the European Community Copyright Avail: CASI HC A02/MF A03

A development tool called the 'visual cockpit' is discussed. A comparison of civil and military transport aircraft development shows a significant technology gap on the military tactical transport side during the last 30 years. Therefore, it seems very beneficial to consider a 'dual use' of well-proven 'civil technologies' for military applications. Specific military transport missions require aircraft capabilities, some of which are quite new and therefore challenging for transport aircraft (e.g. low level flight profiles in night and poor visibility conditions). The demonstration of the feasibility and an evaluation of technical solutions imply the need for suitable development tools. The Virtual Cockpit is explained in terms of its components (hardware/software), features, and capabilities. A major field of investigation in this context is the aircraft systems' central control and monitoring.

N92-28548# Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Flugmechanik. THE ROLE OF SYSTEMS SIMULATION FOR THE

DEVELOPMENT AND QUALIFICATION OF ATTASD. HANKE, H.-H. LANGE, and P. SAAGER *In* AGARD, Piloted Simulation Effectiveness 11 p Feb. 1992

Copyright Avail: CASI HC A03/MF A03

The Advanced Technologies Testing Aircraft System (ATTAS) is a flight test vehicle to be used as a flying simulator to demonstrate and validate new methods and technologies. In order to provide broad testing capabilities, ATTAS was heavily modified and equipped with a powerful digital fly-by-wire/light flight control system. Presented here is a technical description of the simulator

structure and simulation capabilities. Also addressed is the specific role of system identification techniques for simulator validation. Several examples are given demonstrating system performance. Finally, conclusions concerning the merits of system simulation for the ATTAS development and operation are discussed.

Author

N92-28549# Douglas Aircraft Co., Inc., Long Beach, CA.
THE USE AND EFFECTIVENESS OF PILOTED SIMULATION IN
TRANSPORT AIRCRAFT RESEARCH AND DEVELOPMENT
J. HODGKINSON, K. F. ROSSITTO, and E. R. KENDALL In
AGARD, Piloted Simulation Effectiveness 8 p Feb. 1992
Copyright Avail: CASI HC A02/MF A03

Simulation requirements for military and for commercial transport aircraft are contrasted. The special problems introduced by active control are discussed with reference to earlier fighter data. Transport simulator experiments to explore these problems are described.

Author

N92-28550# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.

AN EVALUATION OF IFR APPROACH TECHNIQUES: GENERIC HELICOPTER SIMULATION COMPARED WITH ACTUAL FLIGHT

L. D. REID, S. ADVANI, and J. H. DELEEUW In AGARD, Piloted Simulation Effectiveness 18 p Feb. 1992 (Contract W2207-7-AF69/01-SS)

Copyright Avail: CASI HC A03/MF A03

Described here is a comparison process using a generic helicopter simulator and flight tests carried out in the National Aeronautical Establishment's Bell 205 research helicopter. The project was designed to establish some initial application boundaries for the newly commissioned helicopter simulator. Hence, the validation process took place in the reverse order, with the helicopter simulator runs performed after the flight tests.

Author

N92-28551*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

APPLICATION OF PILOTED SIMULATION TO HIGH-ANGLE-OF-ATTACK FLIGHT-DYNAMICS RESEARCH FOR FIGHTER AIRCRAFT

MARILYN E. OGBURN (Vigyan Research Associates, Inc., Hampton, VA.), JOHN V. FOSTER, and KEITH D. HOFFLER (Vigyan Research Associates, Inc., Hampton, VA.) // AGARD, Piloted Simulation Effectiveness 16 p Feb. 1992 Copyright Avail: CASI HC A03/MF A03

The use of piloted simulation at Langley Research Center as part of the NASA High-Angle-of-Attack Technology Program (HATP), which was created to provide concepts and methods for the design of advanced fighter aircraft, is reviewed. A major research activity within this program is the development of the design processes required to take advantage of the benefits of advanced control concepts for high angle of attack agility. Fundamental methodologies associated with the effective use of piloted simulation for this research are described, particularly those relating to the test techniques, validation of the test results, and design guideline/criteria development.

N92-28552# British Aerospace Public Ltd. Co., Lancashire (England). Military Aircraft Div.

EFFECTIVE CUEING DURING APPROACH AND TOUCHDOWN: COMPARISON WITH FLIGHT

PETER BECKETT *In* AGARD, Piloted Simulation Effectiveness 11 p Feb. 1992

Copyright Avail: CASI HC A03/MF A03

The importance of the various cues provided by flight simulators is a topic for continual debate. Designers of simulators must wrestle with the issue in order to create a sufficient illusion of flight that allows the pilot to carry out his tasks. Hopefully, he becomes stimulated in a similar manner to the real world and behaves accordingly. For training purposes, we are then reinforcing behavior patterns. In research and development simulation, we become

more confident that problems or deficiencies of pilot/aircraft interaction are identified early. Clearly, if the cueing is identical to the real world, we would expect identical behavior from the pilot. Simulators invariably fall short of this in many ways. What are considered to be essential cueing requirements are often intuitive, sometimes based on experience and sometimes completely open to individual opinion. A good test of cueing effectiveness is a comparison with flight. The cueing issues for landing approach and touchdown of fast jets are discussed here and simulation results are compared with flight.

N92-28579# Technische Univ., Delft (Netherlands). Faculty of Aerospace Engineering.

THE BASIC RESEARCH SIMULATOR PROGRAMME AND THE INDUSTRIAL AND AEROSPACE COMMUNITY:
OPPORTUNITIES FOR COOPERATIVE RESEARCH

S. K. ADVANI Oct. 1991 69 p

(LR-662; ETN-92-91401) Avail: CASI HC A04/MF A01

The configuration of the basic research simulator and the proposed applications of the facility are outlined. The benefits to industry of the simulator are: the dynamic behavior and control of motion platforms; the performance of vehicle simulations in a ground based environment; and the human factors of vehicle operation. The dynamic behavior of a motion platform can be improved by minimizing the mass of the moving components and by placing the center of gravity in a low vertical location. In practice, metal fiber laminates (hybrid materials) will form the primary structure of the basic research simulator in order to minimize its weight. To lower the center of gravity, the cockpit floor will be attached beneath the primary load bearing frame of the moving platforms and below its gimbals. Further improvements to the dynamic properties will be achieved through the application of multivariable control techniques to drive the six degrees of freedom motion system. A motion system with favorable dynamic properties can serve as an ideal tool for conducting basic research in vehicle simulation and in human factors: motion signal noise and parasitic displacements on the nondriven directions can be virtually cancelled by proper design and control techniques. The provision for flexible cockpit and instrument arrangements supports research into instrument display formats.

N92-28661# National Aerospace Lab., Amsterdam (Netherlands). Aerodynamics Div.

THE WINDTUNNEL AS A TOOL FOR LAMINAR FLOW RESEARCH

A. ELSENAAR 8 May 1990 17 p Presented at 17th ICAS Congress, Stockholm, Sweden, 9-14 Sep. 1990 Previously announced in IAA as A91-24324 Sponsored in part by Netherlands Agency for Aerospace Programs (NLR-TP-90145-U; ETN-92-91536) Avail: CASI HC A03/MF A01

Testing laminar airfoils or wings in the wind tunnel entails some specific experimental problems. These problems are discussed using the (limited) experience of laminar flow tests made in a high speed wind tunnel. Special measurement techniques like infrared imaging for transition detection and fast continuous wake rake traverses, are required for detailed drag assessment. Premature transition due to contamination of the airfoil surface appears to be a problem. The transition location in flight is unlikely to be duplicated in the wind tunnel due to flow quality and Reynolds number differences. Therefore a methodology to extrapolate the wind tunnel test result to flight conditions is discussed.

N92-28669# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

INSTRUMENTATION REQUIREMENTS FOR LAMINAR FLOW RESEARCH IN THE NLR HIGH SPEED WIND TUNNEL HST

A. ELSENAAR, P. B. ROHNE, D. ROZENDAL, and R. POESTKOKE 8 May 1989 14 p Presented at the 13th International Congress on Instrumentation in Aerospace Simulation Facilities, Goettingen, Fed. Republic of Germany, 18-21 Sep. 1989 Previously announced in IAA as A90-28283

(NLR-TP-89158-Ú; ETN-92-91520) Avail: CASI HC A03/MF A01 The testing of laminar flow airfoils and wings in wind tunnels imposes very stringent requirements on the wind tunnel and the measurement techniques. Starting from experience obtained in high speed tunnels, typical aspects like scale effects, flow quality and model contamination are discussed. Different techniques of transition detection are revised, and the infrared technique in combination with continuous wake rake traverses is concluded to provide the best opportunities for a detailed experimental analysis of a particular laminar flow design.

N92-28673*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

FLOW QUALITY STUDIES OF THE NASA LEWIS RESEARCH CENTER 8- BY 6-FOOT SUPERSONIC/9- BY 15-FOOT LOW SPEED WIND TUNNEL

E. ALLEN ARRINGTON and MARK T. PICKETT Jul. 1992 47 p Presented at the 17th Aerospace Ground Testing Conference, Nashville, TN, 6-8 Jul. 1992; sponsored in part by AIAA

(Contract NAS3-25266; RTOP 505-62-84) (NASA-TM-105417; E-6827; NAS 1.15:105417; A

(NASA-TM-105417; E-6827; NAS 1.15:105417; AIAA PAPER 92-3916) Avail: CASI HC A03/MF A01

A series of studies were conducted to determine the existing flow quality in the NASA Lewis 8 by 6 Foot Supersonic/9 by 15 Foot Low speed Wind Tunnel. The information gathered from these studies was used to determine the types and designs of flow manipulators which can be installed to improve overall tunnel flow quality and efficiency. Such manipulators include honeycomb flow straighteners, turbulence reduction screens, corner turning vanes, and acoustic treatments. The types of measurements, instrumentation, and results obtained from experiments conducted at several locations throughout the tunnel loop are described.

Author

N92-28772# Wright Lab., Wright-Patterson AFB, OH. A METHODOLOGY FOR THE EVALUATION OF RUNWAY ROUGHNESS FOR REPAIR

JOHN T. RIECHERS Sep. 1991 39 p (AD-A250407; WL-TM-02-307-FIBE) Avail: CASI HC A03/MF A01

The Structural Integrity Branch has supported the evaluation of aircraft response to ground induced loadings through modeling since the 1970's. A methodology for the use of these modeling techniques to evaluate a runway for roughness, and to rate the prospective repairs by effectiveness is presented. This information can be used by local civil engineering to determine the extent of repairs required, and if these repairs can be accomplished under general maintenance funds allocations, or if a major construction request is necessary.

N92-28829# National Aerospace Lab., Tokyo (Japan). Aeroengine Div.

AIR EJECTOR EXPERIMENTS USING THE

TWO-DIMENSIONAL SUPERSONIC CASCADE TUNNEL: ZERO SECONDARY FLOW PERFORMANCE Report No. 1

SUSUMU TAKAMORI and HAJIME SAKAGUCHI Feb. 1991 19 p In JAPANESE (ISSN 0452-2982)

(NAL-TM-632; JTN-92-80350) Avail: CASI HC A03/MF A01

The air ejector has almost limitless application possibilities in engineering practice due to its simplicity. To determine the feasibility of using an ejector as a suction pump for boundary layer air removal in the two dimensional supersonic cascade tunnel, especially when a portion of the tunnel's air supply is used for its primary flow, both subsonic and supersonic air ejector tests were conducted. The tested ejector was axially symmetrical and a center jet type, with its geometrical configuration being varied, i.e., the primary nozzle to mixing tube throat area ratio, and the straight mixing space (mixing tube) and diverging passage section (diffuser) lengths. These configuration changes enabled geometrical effects on ejector performance to be obtained. The following experimental results using a zero secondary flow air ejector are discussed: (1) the effects of the straight mixing and diverging passage section lengths on the relationship between secondary pressure (secondary

vacuum chamber pressure) and primary stagnation pressure (primary pressure characteristics) during a zero secondary flow condition; (2) the effect of throat area ratio of primary nozzle to mixing tube on primary pressure characteristics; (3) the relationship between the minimum secondary pressure and throat area ratio; (4) the optimal operating conditions for a zero secondary flow subsonic ejector; and (5) the effect of primary Mach numbers on a zero secondary flow supersonic ejector performance.

Author (NASDA)

N92-28833# National Aerospace Lab., Tokyo (Japan). Advanced Aircraft Research Group.

UPGRADING THE DATA PROCESSING SECTION OF THE NAL GUST WIND TUNNEL DATA PROCESSING SYSTEM

AKIHITO IWASAKI, TOSHIMI FUJITA, and HIROTOSHI FUJIEDA May 1991 22 p In JAPANESE (ISSN 0452-2982)

(NAL-TM-635; JTN-92-80352) Avail: CASI HC A03/MF A01

The data processing system in NAL Gust Wind Tunnel is composed of data acquisition and data processing sections. The outline of the system used to upgrade the data processing section and secondary date processing for wind tunnel data are described. The new system includes an Eclipse MV/7800XP CPU, six megabytes of memory, and various peripheral devices. Performance enhancements were obtained using this upgrade.

Author (NASDA)

N92-28835# National Aerospace Lab., Tokyo (Japan). Aircraft Aerodynamics Div.

REPLACEMENT OF THE NAL HIGH PRESSURE AIR STORAGE SYSTEM

SHIGEO BABA, HISASHI SUENAGA, MASAMITU SUZUKI, and NOBUHIRO TODA Mar. 1991 31 p in JAPANESE (ISSN 0452-2982)

(NAL-TM-634; JTN-92-80362) Avail: CASI HC A03/MF A01

The replacement process is described for the high pressure air storage vessel attached to the 2 m x 2 m Transonic Wind Tunnel of the NAL. The oldest two of three existing 10 m diameter vessel were dismantled and replaced by a new 13 m diameter vessel, thereby preserving the total capacity. Both the operational and maintenance histories of the old vessel are discussed, as well as the design construction features included in the new one, its initial test results, and the important issues related to future system operations.

Author (NASDA)

N92-29204# National Aerospace Lab., Amsterdam (Netherlands).

NARSIM: A REAL-TIME SIMULATOR FOR AIR TRAFFIC CONTROL RESEARCH

W. DENBRAVEN and J. M. TENHAVE 25 May 1990 58 p Submitted for publication

(NLR-TP-90147-U; ETN-92-91537) Avail: CASI HC A04/MF A01

The lack of capacity and efficiency in the present day air transportation system is noted. Developments towards a future integrated Air Traffic Management (ATM) system were initiated in order to reduce these deficiencies. Real time Air Traffic Control (ATC) simulators, such as the NLR ATC Research Simulator (NARSIM), will play an essential role in the research on this future ATC, thus describing the area of interest for ATC research simulation. NARSIM is described. Its functions are characterized, followed by a description of the air traffic controller's work environment, the hardware configuration, and the controller workstations. An introduction to NARSIM's main research areas, which are integrated ATM and the man machine interface, is given.

N92-29352*# North Carolina State Univ., Raleigh. BUFFET TEST IN THE NATIONAL TRANSONIC FACILITY Final Report

CLARENCE P. YOUNG, JR., DENNIS W. HERGERT, THOMAS W. BUTLER, and FRED M. HERRING Jul. 1992 66 p Prepared in cooperation with Boeing Co., Seattle, WA Original contains color illustrations

(Contract NCC1-141; RTOP 505-59-85-01)

(NASA-CR-189595; NAS 1.26:189595) Avail: CASI HC A04/MF A01; 2 functional color pages

A buffet test of a commercial transport model was accomplished in the National Transonic Facility at the NASA Langley Research Center. This aeroelastic test was unprecedented for this wind tunnel and posed a high risk for the facility. Presented here are the test results from a structural dynamics and aeroelastic response point of view. The activities required for the safety analysis and risk assessment are described. The test was conducted in the same manner as a flutter test and employed on-board dynamic instrumentation, real time dynamic data monitoring, and automatic and manual tunnel interlock systems for protecting the model.

Author

N92-29505# General Electric Co., Gilbert, AZ. Government Services

TRANSPORT DELAY MEASUREMENTS: METHODOLOGY AND ANALYSIS FOR THE F-16C COMBAT ENGAGEMENT TRAINER, THE DISPLAY FOR ADVANCED RESEARCH AND TRAINING, AND THE F-16A LIMITED FIELD OF VIEW Final Technical Paper, Mar. 1991 - Jan. 1992

ROGER W. LEINENWEVER and SUSANNE I. MORAN Mar. 1992 30 p

(Contract F33615-88-C-0014)

(AD-A248519; AL-TP-1992-0009) Avail: CASI HC A03/MF A01

Transport delays between the cockpit and visual/sensors in simulation systems can result in significant degradation of flight simulation training. At the Armstrong Laboratory, Aircrew Training Research Division, methodologies for testing visible delays were developed and measurements run on three systems. The tests showed significant transport delays; in some cases, higher than anticipated. Further analysis of the data revealed that the delays were caused by specific hardware and software configurations. Changes in configurations can eliminate the problem entirely, or can decrease transport delays to an acceptable range.

N92-29655*# MCAT Inst., San Jose, CA.
STUDY OF OPTICAL TECHNIQUES FOR THE AMES UNITARY
WIND TUNNELS. PART 3: ANGLE OF ATTACK Progress
Report

GEORGE LEE Jun. 1992 27 p (Contract NCC2-716) (NASA-CR-190541: NAS 1 26:190541: MCAT-92

(NASA-CR-190541; NAS 1.26:190541; MCAT-92-011-PT-3) Avail: CASI HC A03/MF A01

A review of optical sensors that are capable of accurate angle of attack measurements in wind tunnels was conducted. These include sensors being used or being developed at NASA Ames and Langley Research Centers, Boeing Airplane Company, McDonald Aircraft Company, Arnold Engineering Development Center, National Aerospace Laboratory of the Netherlands, National Research Council of Canada, and the Royal Aircraft Establishment of England. Some commercial sensors that may be applicable to accurate angle measurements were also reviewed. It was found that the optical sensor systems were based on interferometers, polarized light detector, linear or area photodiode cameras, position sensing photodetectors, and laser scanners. Several of the optical sensors can meet the requirements of the Ames Unitary Plan Wind Tunnel. Two of these, the Boeing interferometer and the Complere lateral effect photodiode sensors are being developed for the Ames Unitary Plan Wind Tunnel. Author

N92-29709# Anacapa Sciences, Inc., Fort Rucker, AL.
ASSESSMENT OF ARMY AVIATORS' ABILITY TO PERFORM
INDIVIDUAL AND COLLECTIVE TASKS IN THE AVIATION
NETWORKED SIMULATOR Interim Report, Sep. 1988 - Nov.
1990

BETH W. SMITH and KENNETH D. CROSS Apr. 1992 92 p (Contract MDA903-87-C-0523; AF PROJ. 3405) (AD-A250293; ARI-RN-92-32) Avail: CASI HC A05/MF A01

This research evaluates the training effectiveness of the Aviation Networked Simulator (hereafter referred to as AIRNET). The research was designed to (1) assess experienced

crewmembers' ability to perform selected individual and collective tasks in AIRNET, and (2) identify the specific design attributes that makes it difficult for crewmembers to perform tasks to standards in AIRNET. Because the research examined only in-simulator performance, inferences about the device's training effectiveness can be drawn only from data indicating that experienced crewmembers cannot perform a task effectively in AIRNET. Specifically, it is assumed that tasks cannot be trained effectively on a device if they cannot be performed adequately on that device. Transfer-of-training studies are required to assess the AIRNET's effectiveness for training tasks that can be performed adequately on the device. The report presents detailed data on the relative effectiveness of crewmembers performing the individual and collective tasks investigated. The report also presents detailed data on crewmember ratings of the adequacy of AIRNET for both performing and training specific tasks and conclusions and recommendations about the need to modify the design of AIRNET GRA components.

N92-30076# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Helicopter Div.

EXPERIENCE WITH PILOTED SIMULATION IN THE DEVELOPMENT OF HELICOPTERS

M. OBERMAYER, K. KAMPA, W. DOEHNEL, and A. FAULKNER 1991 12 p Presented at 79th AGARD Flight Mechanics Panel Symposium on Pilot Simulation Effectiveness, Brussels, Belgium, 14-17 Oct. 1991 Previously announced as N92-28528 (MBB-UD-0610-91-PUB; ETN-92-91697) Avail: CASI HC A03/MF A01

Applicability, limitations, acceptance, and effectiveness of helicopter simulation are considered. Some of the key points are the objective and subjective validation of a simulator and the various factors which influence the acceptance by pilots. In this context it is very important to make a tradeoff between simulator sophistication (i.e., cost) and required result (i.e., design input) in the actual phase of development. Other aspects of simulation effectiveness include evaluation and training of critical flight conditions prior to flight tests as well as involving the customer from early concept studies up to full mission simulations, which gives more influence in the design and leads to better identification with product. 'Do's' and 'don'ts' in piloted simulation to achieve maximum simulation effectiveness are presented.

10

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

A92-45442* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX. SPACE SHUTTLE ORBITER AUXILIARY POWER UNIT STATUS

M. RECK, G. LOKEN, J. HORTON, W. LUKENS (Sundstrand Aerospace, Rockford, IL), W. SCOTT (NASA, Johnson Space Center, Houston, TX), J. BAUGHMAN (Rockwell International Corp., Downey, CA), and T. BAUCH (STS Corp., Tokyo, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 731-747. refs

(SAE PAPER 912060) Copyright

An overview of the United States Space Shuttle Orbiter APU, which provides power to the Orbiter vehicle hydraulic system, is presented. Three complete APU systems, each with its own separate fuel system, supply power to three dedicated hydraulic

systems. These in turn provide power to all Orbiter vehicle critical flight functions including launch, orbit, reentry, and landing. The basic APU logic diagram is presented. The APU includes a hydrazine-powered turbine that drives a hydraulic pump and various accessories through a high-speed gearbox. The APU also features a sophisticated thermal management system designed to ensure safe and reliable operation in the various launch, orbit, reentry, and landing environments.

A92-46428 PROPULSION SYSTEMS FROM TAKEOFF TO HIGH-SPEED FLIGHT

F. S. BILLIG (Johns Hopkins University, Laurel, MD) IN: High-speed flight propulsion systems. Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1991, p. 21-100.

Copyright

Potential applications for missiles and aircraft requiring highly efficient engines serve as the basis for discussing new propulsion concepts and novel combinations of existing cycles. Comparisons are made between rocket and airbreathing powered missiles for anti-ballistic and surface-to-air missions. The properties of cryogenic hydrogen are presented to explain the mechanics and limitations of liquid air cycles. Conceptual vehicle designs of a transatmospheric accelerator are introduced to permit examination of the factors that guide the choice of the optimal propulsion system.

A92-46726

CREW TRANSPORTATION FOR THE 1990S. I -COMMERCIALIZING MANNED FLIGHT WITH TODAY'S PROPULSION

ROBERT STAEHLE and J. R. FRENCH (World Space Foundation, South Pasadena, CA) Foundation Astronautics Notebook - 30, 1989.

Two commercial space transport concepts that have been developed employing reusable production engines are discussed. A winged space transport (WST) launched from a Boeing 747 was sized to carry six people to low orbit. With no margin for performance growth, it is not favored for development. A vertical launch/landing space transport was designed with capabilities and propulsion similar to the WST, but launched from the ground. A small launch mass penalty is offset by improved performance margins and by eliminating carrier aircraft costs. The two-pilot plus five-passenger vehicle is designed for short-duration trips to low earth orbit, or for docking up to 10 d at an orbiting station. Market applications include space station crew rotation, equipment delivery and product return, short-duration experiments, satellite servicing, reconnaissance, and tourism. Profitable per-mission prices are projected at \$10-15 million, with development costs approaching \$400 million.

A92-46766

THRUST/SPEED EFFECTS ON LONG-TERM DYNAMICS OF AEROSPACE PLANES

GOTTFRIED SACHS (Muenchen, Technische Universitaet, Munich, Federal Republic of Germany) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 1050-1053. refs Copyright

An effort is made to deepen perspectives concerning thrust/speed effects on long-term modes of motion, and results are presented for the hypersonic flight regime in view of analytical considerations which accentuate their generality. In the cases of both direct and indirect thrust/speed effects, there are significant reductions in the sensitivities of the phugoid and height mode throughout the hypersonic Mach number range.

O.C.

A92-48712#

ABLATIVE CONTROL MECHANISM IN NOZZLE THERMO-PROTECTION

HONGQING HE and XU ZHOU (Northwestern Polytechnical University, Xian, People's Republic of China) AIAA, SAE, ASME,

and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville. TN, July 6-8, 1992. 5 p. refs

(AIAA PAPER 92-3054) Copyright

Expressions for mass consumption rates of oxygen-bearing components in gas flow and of thermoprotective lining materials are deduced, then mass calculated equations of ablation are deductions are in accordance aerodynamic-thermochemical reaction under conditions of three types of ablative control mechanisms. The transient equivalent thermocapacity heat-conduction equation for multilayer nozzle construction under ablative moving boundaries is solved with an implicit scheme.

A92-48780*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

AN EXPERIMENTAL INVESTIGATION OF **HIGH-ASPECT-RATIO COOLING PASSAGES**

JULIE A. CARLILE (NASA, Lewis Research Center, Cleveland, OH) and RICHARD J. QUENTMEYER (Sverdrup Technology, Inc., Brook Park; NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Previously announced in STAR as N92-25958. refs

(AIAA PAPER 92-3154) Copyright

An experimental investigation was conducted to evaluate the effectiveness of using high-aspect-ratio cooling passages to improve the life and reduce the coolant pressure drop in high-pressure rocket thrust chambers. A plug-nozzle rocket-engine test apparatus was used to test two cylindrical chambers with low-aspect-ratio cooling passages and one with high-aspect-ratio cooling passages. The chambers were cyclically tested and data were taken over a wide range of coolant mass flows. The results showed that for the same coolant pressure drop, the hot-gas-side wall temperature of the high-aspect-ratio chamber was 30 percent lower than the baseline low-aspect-ratio chamber, resulting in no fatigue damage to the wall. The coolant pressure drop for the high-aspect-ratio chamber was reduced in increments to one-half that of the baseline chamber, by reducing the coolant mass flow, and still resulted in a reduction in the hot-gas-side wall temperature when compared to the low-aspect-ratio chambers. Author

National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MIXING AND COMBUSTION EFFECTS IN A SLIDING-WEDGE RAM ACCELERATOR WITH HYDROGEN INJECTION

R. RAMAKRISHNAN and D. J. SINGH (Analytical Services and Materials, Inc., Hampton, VA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 18 p. refs (Contract NAS1-19320)

(AIAA PAPER 92-3251)

The ram accelerator concept has been envisioned as the basis of a ground-based flight-test facility concept in which the test section follows the ram-accelerated projectile, and allows hydrogen mixing/combustion experiments to be conducted when hydrogen carried by the projectile is injected into the freestream. A numerical simulation is presently conducted for such mixing and combustion: the chemical reactions in question are modeled using a seven-step, seven-species model. A grid-adaptation procedure is used to resolve flow features in areas of high fluid and species gradients. O.C.

N92-29104*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

PERFORMANCE OF UNCOATED AFRSI BLANKETS DURING **MULTIPLE SPACE SHUTTLE FLIGHTS**

PAUL M. SAWKO and HOWARD E. GOLDSTEIN Apr. 1992 36 p

(Contract RTOP 506-43-31)

(NASA-TM-103892; A-91237; NAS 1.15:103892) Avail: CASI HC A03/MF A01

Uncoated Advanced Flexible Reusable Surface Insulation (AFRSI) blankets were successfully flown on seven consecutive flights of the Space Shuttle Orbiter OV-099 (Challenger). In six of the eight locations monitored (forward windshield, forward canopy, mid-fuselage, upper wing, rudder/speed brake, and vertical tail) the AFRSI blankets performed well during the ascent and reentry exposure to the thermal and aeroacoustic environments. Several of the uncoated AFRSI blankets that sustained minor damage, such as fraying or broken threads, could be repaired by sewing or by patching with a surface coating called C-9. The chief reasons for replacing or completely coating a blanket were fabric embrittlement and fabric abrasion caused by wind erosion. This occurred in the orbiter maneuvering system (OMS) pod sidewall and the forward mid-fuselage locations. Author

N92-29343*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

APPLIED ANALYTICAL COMBUSTION/EMISSIONS RESEARCH AT THE NASA LEWIS RESEARCH CENTER **Progress Report**

J. M. DEUR (Sverdrup Technology, Inc., Brook Park, OH.), K. P. KUNDU, and H. L. NGUYEN Jul. 1992 14 p Presented at the 28th Joint Propulsion Conference and Exhibit, Nashville, TN, 6-8 Jul. 1992

(Contract RTOP 537-02-20)

(NASA-TM-105731; E-7135; AIAA PAPER 92-3338; NAS 1.15:105731) Avail: CASI HC A03/MF A01; 3 functional color pages

Emissions of pollutants from future commercial transports are a significant concern. As a result, the Lewis Research Center (LeRC) is investigating various low emission combustor technologies. As part of this effort, a combustor analysis code development program was pursued to guide the combustor design process, to identify concepts having the greatest promise, and to optimize them at the lowest cost in the minimum time. Author

Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Hubschrauber und Flugzeuge. SAENGER: THE REFERENCE CONCEPT AND ITS

TECHNOLOGICAL REQUIREMENTS -AEROTHERMODYNAMICS

E. H. HIRSCHEL 26 Aug. 1991 16 p Presented at Review of the German Hypersonic and Technology Programme, Bonn, Fed. Republic of Germany, 16-17 Apr. 1991

(MBB-FE-202-S-PUB-0463-A; ETN-92-91496) Copyright Avail: CASI HC A03/MF A01

The objectives of the technology program 'aerothermodynamics and propulsion integration' are defined. An overview of the special aerothermodynamic phenomena which must be regarded in the design of the Saenger lower stage which presently stands in the center of the technology program is given. The design tools, which must be provided; the components like the inlet, the afterbody, etc., which must be designed and tested; and the special problems like forebody optimization, heat load determination, upper stage integration, etc., which must be treated, are discussed. The general work plan is presented, showing the major activities up to start of the development of the Saenger space transportation system. It includes the development and manufacturing of the experimental vehicle (HYTEXT) as a means for the validation of the design tools and methods which are achieved in the technology program, and for the creation of a freeflight data base.

N92-29680# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Hubschrauber und Flugzeuge.

AEROTHERMODYNAMIC CHALLENGES OF THE SAENGER **SPACE-TRANSPORTATION SYSTEM**

E. H. HIRSCHEL 2 Sep. 1991 13 p Presented at 1st European Symposium on Aerothermodynamics for Space Vehicles, Noordwijk, Netherlands, 28-30 May 1991

(MBB-FE-202-S-PUB-0462-A; ETN-92-91495) Copyright Avail: CASI HC A03/MF A01

The two-stage-to-orbit Saenger space transportation system is the reference concept of the German hypersonics technology program. The technology development concentrates first on the needs of the lower stage. Its requirements on aerothermodynamics and propulsion integration are sketched. The aerothermodynamic design challenge is discussed and the design tools and the design methodology are reviewed. The calibration of both the computational and the experimental methods, as well as the test of vehicle components like the inlet, control surfaces etc., make the Hypersonic Technology Experimental vehicle (HYTEX) mandatory. Contents and workplan of the technology program 'aerothermodynamics and propulsion integration' are laid out. Selected results from the current work are presented.

11

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

A92-45234

ELEVATED TEMPERATURE CRACK GROWTH IN AIRCRAFT ENGINE MATERIALS

THEODORE NICHOLAS (USAF, Materials Laboratory, Wright-Patterson AFB, OH) and SHANKAR MALL (USAF, Institute of Technology, Wright-Patterson AFB, OH) IN: Advances in fatigue lifetime predictive techniques; Proceedings of the Symposium, San Francisco, CA, Apr. 24, 1990. Philadelphia, PA, American Society for Testing and Materials, 1992, p. 143-157. Research sponsored by USAF. refs

Copyright

Crack growth rate characteristics in Inconel 718 and a Ti3Al titanium aluminide alloy are compared at 650 C under conditions of cyclic loading and superimposed hold times at maximum load. Whereas a decrease in frequency increases the growth rate in both materials, addition of hold times has different effects in the two materials. Hold times increase the growth rate in Inconel 718, but cause anywhere from a slight increase to a very slight decrease in growth rate in Ti3Al, depending on the cyclic frequency. A simple empirical model is proposed which accounts for crack growth retardation due to creep blunting from old time effects and considers the environmental degradation of the material while exposure time. The model is seen to provide reasonable capability to reproduce most of the growth rate characteristics observed experimentally while using the stress intensity factor, K, as the correlating parameter.

A92-45236 CONTRIBUTION OF INDIVIDUAL LOAD CYCLES TO CRACK GROWTH UNDER AIRCRAFT SPECTRUM LOADING

R. SUNDER (National Aeronautical Laboratory, Bangalore, India) IN: Advances in fatigue lifetime predictive techniques; Proceedings of the Symposium, San Francisco, CA, Apr. 24, 1990. Philadelphia, PA, American Society for Testing and Materials, 1992, p. 176-190. Research supported by Aeronautical Development Agency. refs Copyright

A simple crack closure based model is used to analyze fatigue crack growth in airframe materials under a variety of aircraft wing load spectra. The load spectrum and crack growth damage distribution are graphically described by an integrated range/damage-exceedance (RDE) diagram for nondimensionalized representation of load and associated crack growth damage exceedance. The RDA diagram can be used to study the effect of truncation, load omission, and variation in other spectrum variables.

A92-45451

AEROSPACE PLANE HYDROGEN SCRAMJET BOOSTING

A. S. RUDAKOV, V. V. KRIUCHENKO, and A. I. LANSHIN (Tsentral'nyi NII Aviatsionnogo Motorostroeniia, Moscow, Russia) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991,

Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 825-833. refs (SAE PAPER 912071) Copyright

Results are presented of computational investigations carried out to clarify the possibilities of hydrogen scramjet thrust uprating in hypersonic flight (M greater than 8) by adding to the fuel substances with higher density. Thrust, specific impulse, and density impulse are calculated while adding nitrogen, oxygen, water, or inert liquated gases. Fuel is injected tangetially to air flow into combustion chamber with high velocity through gas generator nozzles. For scramjet boosting in hypersonic flight it is suggested to add oxygen to stoichiometric part of hydrogen instead of excessive part of hydrogen.

A92-45600

MICROBIOLOGICAL SPOILAGE OF AVIATION TURBINE FUEL. II - EVALUATION OF A SUITABLE BIOCIDE

H. M. DAYAL, K. C. TEWARI, and G. P. TANDON (Defence Materials and Stores Research and Development Establishment, Kanpur, India) Defence Science Journal (ISSN 0011-748X), vol. 42, no. 1, Jan. 1992, p. 47-52. refs Copyright

Addition of ethylene glycol monoethyl ether, an anti-icing fuel additive, supports microbial growth when added to aviation turbine fuel in low dosages. However, increase in its concentration to certain limits effectively prevents bioactivity in the fuel. The optimum dosage of this biocide for prevention of bioactivity in aviation turbine fuel has been studied by the specific qualitative performance tests after 18 months storage of the inhibited fuel under accelerated conditions of temperature and humidity.

A92-45629

THE RELATIONSHIP BETWEEN TENSILE AND FLEXURAL STRENGTH OF UNIDIRECTIONAL COMPOSITES

MICHAEL R. WISNOM (Bristol, University, England) Journal of Composite Materials (ISSN 0021-9983), vol. 26, no. 8, 1992, p. 1173-1180. Research supported by Westland Helicopters, Ltd. and SERC. refs

Copyright

Weibull theory predicts a higher strength in bending than in tension. However, it assumes that failure initiates from a critical defect, whereas many unidirectional composites fail gradually in bending. A model has been developed of the composite as a bundle, each element of which consists of a small bundle of fibers. The resin is assumed to stabilize the bundle against buckling under compression, while allowing the individual elements to split and behave independently in tension. This model also predicts higher strength in bending than in tension, with a ratio of similar order of magnitude to that predicted by Weibull theory. The new model provides an explanation for the different strengths in bending and tension which is consistent with the progressive, noncatastrophic failure process which is often observed in bending tests of unidirectional composites.

A92-45630

FABRICATION AND MECHANICAL PROPERTIES OF AN OPTICALLY TRANSPARENT GLASS FIBER/POLYMER MATRIX COMPOSITE

JAMES R. OLSON (Carborumdum Co., Whirlpool Technical Center, Niagara Falls, NY), DELBERT E. DAY, and JAMES O. STOFFER (Missouri-Rolla, University, Rolla) Journal of Composite Materials (ISSN 0021-9983), vol. 26, no. 8, 1992, p. 1181-1192. Research supported by McDonnell Aircraft Co. refs Copyright

An optically transparent composite has been produced by reinforcing PMMA with unidirectional borosilicate glass fibers. Optical transparency is achieved by matching the refractive index of the glass fiber and polymer matrix to within + or - 0.002. The optical transmission of the composite decreases with increasing volume percentage of glass fibers. Composites containing 30 volume percent of unidirectional 12-micron diameter fibers have a 589.3 nm transmission of 20 percent measured through a 10 mm thickness. Composites containing 30 volume percent of 56-micron

11 CHEMISTRY AND MATERIALS

diameter fibers have an optical transmission of 45 percent. Typewritten text can be clearly read through the composite when the composite is laid directly on the printed page. A flexural strength of 600 MPa is measured for composites with 40 volume percent fiber. The flexural modulus for the same composite is 18 MPa (nine times greater than the 2 MPa measured for pure PMMA). The work of fracture is 110 kJ/m-sq (more than double that of pure PMMA). Suggestions for further improvements in the optical properties are made.

A92-46631

ENHANCING THE PERFORMANCE CHARACTERISTICS OF ENGINE FUELS BY MEANS OF SURFACTANT ADDITIVES [ULUCHSHENIE EKSPLUATATSIONNYKH KHARAKTERISTIK MOTORNYKH TOPLIV S POMOSHCH'IU POVERKHNOSTNO-AKTIVNYKH PRISADOK]

O. P. LYKOV (GANG, Russia) Khimiia i Tekhnologiia Topliv i Masel (ISSN 0023-1169), no. 1, 1992, p. 16-25. In Russian. refs Copyright

The use of various types of surfactant additives, including detergents, dispersants, antiicing additives, stabilizers, preservatives, and antiwear additives, for enhancing the performance of aviation fuels is discussed. It is shown that small amounts surfactants (0.003-0.2 percent by mass) are capable of producing a significant improvement in the fuel performance characteristics. By using the concepts of colloid chemistry, it is possible to predict the properties of additives and tailor them to specific applications.

A92-46838

AXIAL ALIGNMENT OF SHORT-FIBER TITANIUM ALUMINIDE COMPOSITES BY DIRECTIONAL SOLIDIFICATION

S. L. KAMPE, G. H. SWOPE, and L. CHRISTODOULOU (Martin Marietta Laboratories, Baltimore, MD) IN: Intermetallic matrix composites; Proceedings of the MRS Symposium, San Francisco, CA, Apr. 18-20, 1990. Pittsburgh, PA, Materials Research Society, 1990, p. 97-103. Research supported by DARPA. refs (Contract MDA972-88-C-0047)

The floating zone directional solidification technique has been applied to an XD short-fiber-reinforced titanium aluminide ingot in an effort to produce in situ alignment of the reinforcement. Microstructural evaluation reveals that a general alignment of the high aspect ratio (greater than 100:1) fibers occurs under specific solidification conditions. These metallographic imposed observations are supported by 800 C mechanical data, which indicate higher axial and reduced transverse strengths relative to the unprocessed base material which contains a dispersion of randomly oriented fibers. The increased strengths are observed to be a consequence of an increase in the matrix hardening due accommodation of plastic strain around the fiber reinforcement. Author

A92-47338

LOW VOC PRIMER FOR STRUCTURAL BONDING

WILLIAM DUMARS (Boeing Commercial Airplane Group, Seattle, IN: International SAMPE Environmental Conference, 1st, San Diego, CA, May 21-23, 1991, Proceedings, Vol. 1, Covina, CA, Society for the Advancement of Material and Process Engineering, 1991, p. 119-124.

Copyright

A one-part water-based chromated primer is introduced that can be used for structural bonding on aircraft and that meets pollution-control regulations. The paper emphasizes the results of physical and mechanical testing including: wide-area lap-shear, metal-to-metal peel, honeycomb peel, flatwise tensile, and crack-extension investigations. The corrosion-inhibiting liquid primer is composed of materials similar to those for existing solvent-based primers and has 20 percent nonvolatile compounds, 10.5 percent quantitative inhibitor, and 160 g/l of organic solvent. The low-VOC primer is shown to have good physical and mechanical qualities and to come close to meeting future pollution-control regulations.

A92-47340

ANODIZE AND PRIME YOUR ALUMINUM WITHOUT **ENVIRONMENTAL HEADACHES**

ROBERT L. FLOYD, JR. and BLAIR C. MADDOCK (Lockheed Aeronautical Systems Co., Marietta, GA) IN: International SAMPE Environmental Conference, 1st, San Diego, CA, May 21-23, 1991, Proceedings. Vol. 1. Covina, CA, Society for the Advancement of Material and Process Engineering, 1991, p. 335-346. refs

Conventional procedures for surface finishing of aluminum are increasingly at odds with newer, more stringent regulations for VOC and chromate emissions. An alternative finishing method, resin-real anodizing, provides a means of imparting corrosion resistance to the metal while producing no chromate or volatile emissions. The process employs traditional sulfuric acid anodizing, but modifies the final hydration step by using a resin-containing bath instead of the steam, water, or water solutions typically used. The resin particles are sized to fill the pore structure of the anodic film. The resulting resin-sealed surface acts effectively as a primed surface, and can be used unpainted or topcoated. Not only is the process environmentally friendly, it offers both weight and cost savings to the finished product. Resin-seal anodizing has been successfully used on the C-5 cargo aircraft and has recently been approved for use in selected C-130 aircraft applications.

NON-CHROMATED ANODIZE PROCESS FOR CORROSION RESISTANCE AND ADHESIVE BONDING

JASON MNICH (Rohr Industries, Inc., Riverside, CA) International SAMPE Environmental Conference, 1st, San Diego. CA, May 21-23, 1991, Proceedings. Vol. 1. Covina, CA, Society for the Advancement of Material and Process Engineering, 1991, p. 371-383.

Copyright

A nonchromated anodizing process called sulfuric/boric acid anodizing (SBAA) is presented with descriptions of its use in the production of corrosion resistant adhesively bonded Al skins. The process was developed to replace chromic acid anodizing (CAA) without necessitating emission control equipment and the cost of chromium disposal. At test panels are treated with either SBAA or CAA and tested according to an FAA certified qualification program with lap shear, flatwise tension, salt-spray, and wet paint-adhesion tests. SBAA is found to be superior to the CAA process in a wet floating roller-peel test, and the treatments perform comparably in the other test categories. The results not only demonstrate the value of SBAA for corrosion resistance, adhesion, and reduced Cr(6+) but also show that compliance with environmental regulations can be accomplished by process and materials substitution. C.C.S.

Δ92-47835# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ANALYSIS OF THERMO-CHEMICAL NONEQUILIBRIUM MODELS FOR CARBON DIOXIDE FLOWS

STACEY G. ROCK, GRAHAM V. CANDLER (North Carolina State University, Raleigh), and HANS G. HORNUNG (California Institute of Technology, Pasadena) AIAA, Thermoph 27th, Nashville, TN, July 6-8, 1992. 13 p. refs AIAA, Thermophysics Conference. (Contract NCC1-140; NAGW-1331)

(AIAA PAPER 92-2852) Copyright

The aerothermodynamics of thermochemical nonequilibrium carbon dioxide flows is studied. The chemical kinetics models of McKenzie and Park are implemented in separate three-dimensional computational fluid dynamics codes. The codes incorporate a five-species gas model characterized by a translational-rotational and a vibrational temperature. Solutions are obtained for flow over finite length elliptical and circular cylinders. The computed flowfields are then employed to calculate Mach-Zehnder interferograms for comparison with experimental data. The accuracy of the chemical kinetics models is determined through this comparison. Also, the methodology of the three-dimensional thermochemical nonequilibrium code is verified by the reproduction of the experiments. Author

A92-47958

INVESTIGATION OF THE STRUCTURAL INHOMOGENEITY OF A TITANIUM ALLOY [ISSLEDOVANIE STRUKTURNOI NEODNORODNOSTI TITANOGO SPLAVA]

D. V. IORDANOV, N. D. GIZDOVA, IU. M. SIMEONOVA (Bulgarian Academy of Sciences, Space Research Institute, Stara Zagora, Bulgaria), and A. V. SHOPOV (Institut Mikroelektroniki, Sofia, Bulgaria) B'Igarska Akademiia na Naukite, Dokladi (ISSN 0366-8681), vol. 44, no. 10, 1991, p. 23-25. In Russian. refs Copyright

Inspection of an aircraft engine indicated small cracks of a peculiar type on the titanium ring of the compressor. These cracks were located in a relatively unloaded region; however, under the effect of vibration they could lead to the formation of a 'closed circuit' and to separation of part of the body with subsequent fracture of the compressor. Auger spectroscopy and secondary ion mass spectroscopy were used to analyze the region of ring fracture due to such small cracks. The crack formation was found to be associated with an unusual increase in carbon content in the depthwise direction in the fracture region. This increase may be due to the processing of the material at the metallurgical stage.

A92-48269

CALCULATION METHODS ON EQUIVALENCE RATIO OF MULTI-PROPELLANT FOR PROPULSION SYSTEM

SHAOQING WANG (31st Research Institute, People's Republic of China) Journal of Propulsion Technology (ISSN 1001-4055), no. 3, June 1992, p. 41-46, 40. In Chinese.

Two calculation techniques on the equivalence ratio of multipropellant for propulsion systems are presented. There is no limit to the number of oxidant and fuel species utilized simultaneously. A compound engine consisting of rocket-ramjet, turbojet and afterburner is used as an example.

A92-48578

ADVANCED SUPERALLOYS FOR TURBINE BLADE AND VANE APPLICATIONS

T. KHAN and P. CARON (ONERA, Chatillon, France) (Canadian Institute of Mining and Metallurgy, Symposium on Advances in Gas Turbine Engine Materials, Ottawa, Canada, Aug. 19, 20, 1991) ONERA, TP no. 1992-2, 1992, 19 p. refs (ONERA, TP NO. 1992-2)

Recent developments in single crystal superalloys and their mechanical properties are reviewed. These alloys make it possible to attain turbine inlet temperatures of about 1600 C and a metal temperature in excess of 1100 C. New compositions and improved processing routes are being developed for large directionally solidified and single crystal blades and vanes for applications in industrial gas turbines. The SC 16 superalloy provides a temperature advantage of about 50 C over the IN 738 superalloy along with an excellent corrosion resistance. The MC2 alloy has a very high strength and a temperature capability of greater than 1100 C. AM1 is now being used in the M88 SNECMA engine for the RAFALE fighter plane. Attention is also given to micromechanical models which take into account active slip systems and further progress in NiAl-based intermetallics. O.G.

A92-48610

ALUMINIDES MODIFIED BY PALLADIUM - PROTECTION OF NEW PARTS BY LOCAL FINISHING (ALUMINIURES MODIFIES PAR LE PALLADIUM - DE LA PROTECTION DES PIECES NEUVES A LA RETOUCHE LOCALE)

P. JOSSO, S. ALPERINE (ONERA, Chatillon, France), and P. STEINMETZ (Nancy I, Universite, Vandoeuvre, France) (Surfair IX, Cannes, France, June 3-5, 1992) ONERA, TP no. 1992-49, 1992, 21 p. In French. refs (ONERA, TP NO. 1992-49)

On hot section parts of aircraft turbines consisting of nickel-base superalloys, aluminides modified by platinum have shown high resistance to heat corrosion and high temperature oxidation. Nevertheless, economic considerations have encouraged research with palladium for a less costly replacement metal modifier. The

simplicity of implementing an electrolytic coating of palladium-nickel has allowed the development of a 'buffer' coating technique.

RFP

A92-48713#

ABLATION PERFORMANCE CHARACTERIZATION OF THERMAL PROTECTION MATERIALS USING A MACH 4.4 SLED TEST

R. A. REYNOLDS, G. W. RUSSELL, and R. W. NOURSE (U.S. Army, Missile Command, Redstone Arsenal, AL) — AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. Research supported by U.S. Army. refs (AIAA PAPER 92-3055)

Sled Tests are often used to evaluate ablation performance and to provide design parameters for predicting thermal protection requirements for missile structures. This paper presents a discussion of such a test, performed to determine values of heats of ablation versus ablation temperatures for six materials which are candidates for use in external thermal protection schemes. These relations can then be used to predict ablation performance of these materials when being subjected to aero-heating environments having heating regimes which are reasonably similar to those of the test.

A92-48714#

AEROTHERMAL ABLATION BEHAVIOR OF SELECTED CANDIDATE EXTERNAL INSULATION MATERIALS

R. A. REYNOLDS, R. W. NOURSE, and G. W. RUSSELL (U.S. Army, Missile Command, Redstone Arsenal, AL) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. Research supported by U.S. Army. refs

(AIAA PAPER 92-3056)

Effective heat-of-ablation techniques are used to empirically evaluate the relative ablation performance of several composite materials for use as external thermal protection layers for supersonic, low-altitude missile systems. The candidate materials were subjected to various aerodynamic heating environments using the T-Range Facility at the Naval Air Warfare Center, China Lake, CA. Values of effective heat-of-ablation and ablation temperature are determined for each of the materials; these provide a means of predicting ablation rates for the range of aeroheating environments considered. Predictions using these values are compared to supersonic sled track flight data generated at Holloman Air Force Base, NM. The effective heat-of-ablation techniques employed in this effort provide reasonable engineering accuracy when compared to the track flight data.

A92-48846#

LASER-INITIATED CONICAL DETONATION WAVE FOR SUPERSONIC COMBUSTION. III

G. F. CARRIER, F. E. FENDELL, and M.-S. CHOU (TRW Space and Technology Group, Redondo Beach, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs (Contract F49620-90-C-0070)

(AIAA PAPER 92-3247) Copyright

Further theoretical and experimental studies are undertaken of the feasibility of an air-breathing supersonic combustor based on a stabilized, conically configured (oblique) detonation wave. The conical wave is the resultant of the interaction of a train of spherical detonation waves, each directly initiated by a brief, localized deposition of energy from a very-rapidly-repeated pulsed laser. The laser is tightly focused on a fixed site (in the combustor) where there is a steady uniform supersonic stream of combustible gas. Simple analysis and laboratory experiments on the (nonintrusive) direct initiation of an individual spherical detonation wave by a single laser pulse are reported, with emphasis on the pulse-energy and pulse-duration parameters. Then, an estimate is given of the entropy production associated with the interaction of spherical detonations created in a supersonic reactive stream by a train of laser pulses. The entropy production, which arises from

reflected shocks in already-detonated mixture, is reduced either by increasing the repetition rate of the laser or by increasing the flow speed of the cold-gas mixture.

Author

A92-48848#

NUMERICAL SIMULATIONS OF THE TRANSDETONATIVE RAM ACCELERATOR COMBUSTING FLOW FIELD ON A PARALLEL COMPUTER

MOELJO SOETRISNO, SCOTT T. IMLAY, and DONALD W. ROBERTS (Amtec Engineering, Inc., Bellevue, WA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 20 p. refs (Contract DAAH01-90-C-0373)

(AIAA PAPER 92-3249) Copyright

The present finite-rate combusting flow results for a 38-mm ram accelerator projectile cover a total of ten cases in the thermally-choked and the transdetonative operation modes and were obtained by means of both sequential and MIMD parallel computation. Attention is given to the modified diagonal implicit algorithm's parallel speed-up, efficiency, convergence, and robustness for several axisymmetric combusting flows. Results from these laminar calculations demonstrate the critical effects of boundary-layer combustion in the transdetonative operation mode.

A92-48919*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

A SIMPLIFIED REACTION MECHANISM FOR PREDICTION OF NO(X) EMISSIONS IN THE COMBUSTION OF HYDROCARBONS

K. P. KUNDU (NASA, Lewis Research Center, Cleveland, OH) and J. M. DEUR (Sverdrup Technology, Inc., Brookpark, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3340) Copyright

A simplified reaction mechanism is developed for the prediction of NO(x) in hydrocarbon combustion. The mechanism uses fewer reacting species and reaction steps than the detailed mechanisms available in the literature and therefore takes less computer time when used in CFD calculations. The mechanism has been used to calculate NO(x) emissions in the combustion of propane. With slight modifications, the same mechanism can be used to calculate NO(x) in the combustion of other hydrocarbons. Results obtained with the simplified reaction are compared with experimental results and results obtained with a detailed kinetic mechanism. V.L.

A92-48927#

MEASUREMENT OF SCALAR FLOWFIELD AT EXIT OF COMBUSTOR SECTOR USING RAMAN DIAGNOSTICS

ANIL GULATI (GE Corporate Research and Development Center, Schenectady, NY) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs.

(AIAA PAPER 92-3350) Copyright

The technique of spontaneous Raman diagnostics is applied to the exit plane of an aircraft engine combustor sector to successfully demonstrate extension of the technique to practical hardware fueled with both natural gas and liquid fuel (kerosene). To handle flame-generated incandescene and laser-induced fluorescence expected in such an application, the technique is first applied to a laminar, sooty CH4/CO flame to generate the calibration coefficients needed to correct for this interference. Raman profiles of temperature and major species are obtained at the sector exit with both natural gas and kerosene as fuel. The mean temperature data is shown to agree fairly well with thermocouple measurements at identical operating conditions. The rms temperature profiles show up to 12 percent and 16 percent rms fluctuations at the centerline of the burner with natural gas and kerosene, respectively. The mean profiles of major species show the expected trens. Up to 6 and 8 percent unburnt O2 are measured at the centerline for natural gas and kerosene, respectively. Unburnt hydrocarbons, CO and H2, at the centerline, indicate incomplete burning at that plane. The data are interpreted in terms of implications in evaluating combustor performance. Finally, the Raman system is applied to a room temperature cell at elevated pressures to help extend the system to this regime.

Author

A92-48986#

EXPERIMENTAL INVESTIGATION OF LIQUID CARBONHYDROGEN FUEL COMBUSTION IN CHANNEL AT SUPERSONIC VELOCITIES

V. VINOGRADOV, S. KOBYZHSKII, and M. PETROV (Tsentral'nyi NII Aviatsionnogo Motorostroeniia, Moscow, Russia) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3429) Copyright

An experimental investigation of liquid hydrocarbon fuel ignition and combustion stabilization at supersonic velocities in the 2D channel was conducted to study the working process in a scramjet. The model was tested in CIAM's facility at freestream Mach number M of 6.0 and 1500 K temperature. Some variants of combustors with different kerosene injectors and flameholders were studied. Hydrogen was used for ignition and stabilization of kerosene burning. The conditions were found under what the kerosene combustion was successful in a combustor with constant area and expanding sections after the hygrogen stopped being injected. Distributions of aerothermodynamic parameters along the duct, data on stabilization, and joint inlet-combustor work are discussed.

A92-49105#

COMBUSTION OF SOLID FUELED RAMJET. I

I. NAKAGAWA and T. KUWAHARA (Nissan Motor Co., Ltd., Tokyo, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs (AIAA PAPER 92-3727) Copyright

A ducted solid-fueled ramjet is proposed consisting of a primary combustor to produce reactive gases and a secondary combustor to produce final combustion gases. The solid fuels for this ramjet consist of AP as an oxidizer, and carboxyl-terminated polybutadiene mixed with boron particles as a fuel. The combustion characteristics of this fuel were evaluated for various air-flow conditions, using a specially designed direct connect flow facility.

A92-49106#

COMBUSTION OF SOLID FUELED RAMJET. II

A. IIDA (Asahi Chemical Industry Co., Ltd., Ohita, Japan) and I. KOMAI (Nippon Oil and Fats Co., Ltd., Aichi, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p. refs (AIAA PAPER 92-3728) Copyright

In order to improve the combustion performance of solid fueled ramjets, a solid fueled ramjet (DSFR) is introduced in this study. DSFR consists of a primary combustor and a secondary combustor. However, no choked flow exists between both combustors. The gas generator in the primary combustor burns at the stagnation pressure of the secondary combustor which is generated by the induced air from the atmosphere. The results of the flight-performance analysis conducted in this study indicate that the flight distance extends drastically with increasing the flight altitude even though the net impulse is independent of the altitude. In order to operate DSFR effectively, the pressure exponent of burning rate of the fuel-rich propellants is required to be 1.

Author

A92-49134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

IGNITION DELAYS, HEATS OF COMBUSTION, AND REACTION RATES OF ALUMINUM ALKYL DERIVATIVES USED AS IGNITION AND COMBUSTION ENHANCERS FOR SUPERSONIC COMBUSTORS

T. W. RYAN, III, W. W. HARLOWE, and S. SCHWAB (Southwest Research Institute, San Antonio, TX) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by NASA. refs (AIAA PAPER 92-3841) Copyright

The work was based on adapting an apparatus and procedure developed at Southwest Research Institute for rating the ignition quality of fuels for diesel engines. Aluminum alkyls and various Lewis-base adducts of these materials, both neat and mixed 50/50 with pure JP-10 hydrocarbon, were injected into the combustion bomb using a high-pressure injection system. The bomb was pre-charged with air that was set at various initial temperatures and pressures for constant oxygen density. The ignition delay times were determined for the test materials at these different initial conditions. The data are presented in absolute terms as well as comparisons with the parent alkyls. The relative heats of reaction of the various test materials were estimated based on a computation of the heat release, using the pressure data recorded during combustion in the bomb. In addition, the global reaction rates for each material were compared at a selected imperature Author and pressure.

A92-49136#

A STUDY OF THE FLAMMABILITY LIMIT OF THE BACKWARD FACING STEP FLOW COMBUSTION

TAE-HO LEE (Agency for Defense Development, Propulsion Dept., Taejon, Republic of Korea) and DAVID W. NETZER (U.S. Naval Postgraduate School, Monterey, CA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs (AIAA PAPER 92-3846) Copyright

An experimental investigation was conducted in order to determine the flammability limit of the solid-fuel ramjet using the backward-facing step-flow combustion of the plexiglass grain. In order to get the different step-height ratio, the grain was drilled straightforward or stepwise. The PHOENICS computer code was adopted in order to compare the flow patterns of some sample tests using a nonreacting cold turbulent flow model. The stepwise grain give some loading advantage, specially thin and long shape grain design.

N92-28374*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AN ANALYSIS OF COMBUSTION STUDIES IN SHOCK EXPANSION TUNNELS AND REFLECTED SHOCK TUNNELS CASIMIR J. JACHIMOWSKI Jul. 1992 12 p (Contract RTOP 505-62-40-04)

(NASA-TP-3224; L-17025; NAS 1.60:3224) Avail: CASI HC

A03/MF A01

The effect of initial nonequilibrium dissociated air constituents on the combustion of hydrogen in high-speed flows for a simulated Mach 17 flight condition was investigated by analyzing the results of comparative combustion experiments performed in a reflected shock tunnel test gas and in a shock expansion tunnel test gas. The results were analyzed and interpreted with a one-dimensional quasi-three-stream combustor code that includes finite rate combustion chemistry. The results of this study indicate that the combustion process is kinetically controlled in the experiments in both tunnels and the presence of the nonequilibrium partially dissociated oxygen in the reflected shock tunnel enhances the combustion. Methods of compensating for the effect of dissociated

N92-28398# Dayton Univ., OH.

oxygen are discussed.

LUBRICANT EVALUATION AND PERFORMANCE 2 Interim Report, Jul. 1988 - Dec. 1990

COSTANDY S. SABA, M. A. KELLER, H. A. SMITH, R. E. KAUFFMAN, and D. K. TOTH Jan. 1992 576 p (Contract F33615-88-C-2817)

Author

(AD-A247464; UDR-TR-91-53; WL-TR-91-2111) Avail: CASI HC A25/MF A04

The development of improved methods is described for defining, measuring, and assessing high temperature (500-750 F) lubricants for use in advanced aircraft turbine engines and the development of improved techniques for lubricant monitoring and lubricant condition monitoring for advanced lubricating fluids.

Arrhenius plots were developed for describing the effective life of candidate 4 cSt lubricants, polyphenyl ethers, and other experimental fluids as a function of time and temperature for selected limiting values of changes in physical and chemical properties. Significant improvement in AE spectrometer sensitivity for analyzing wear metal was made. An in-line magnetic wear monitor was evaluated for possible application as a condition monitoring device for oil systems. Fluorescence, UV, dielectric constant, voltammetric, and thermal analysis techniques were developed and evaluated as high temperature lubricant monitoring devices. The tribological behavior of high temperature candidate fluids were evaluated and compared in the boundary lubrication regime using sliding four-ball test and various steel and ceramic specimens.

N92-28426# Reinhart and Associates, Inc., Austin, TX. SURFACE RESIDUAL STRESS ANALYSIS OF METALS AND ALLOYS Final Report, 4 Apr. 1991 - 4 Feb. 1992

TEODORO LEON-SALAMANCA and EUGENE R. REINHART Feb. 1992 31 p

(Contract N00019-91-C-0062)

(AD-A248372) Avail: CASI HC A03/MF A01

The critically refracted longitudinal wave (CRLW) technique was used to establish how feasible it is to measure stress changes at the surface and interior of a material, in particular naval airframe metals such as Ti-6Al-4V, 6061-T651 aluminum, and 4340 steel. The CRLW propagation characteristics were found to be potentially practical if use of the 2P wave is implementable to have it as a reference wave. The CRLW technique was effective in detecting stress gradients in bent plates by measuring the acoustoelastic effect on the longitudinal wave velocity. The CRLW technique was applied in the range of 1.0 to 10 MHz and the expected longitudinal wave velocity changes followed the expected trends in the Al6061-T651 and 4340 steel plates (0.50 inch thick). The longitudinal wave velocity changes measured in the Ti-6Al-4V plate did not follow the expected trends probably due to its thickness (0.25 inch).

N92-28912# Naval Civil Engineering Lab., Port Hueneme, CA. PAINT REMOVAL USING CRYOGENIC PROCESSES Final Report, Oct. 1989 - Jun. 1991

RICHARD E. KIRTS and PHILIP L. STONE Jan. 1992 44 p (AD-A247668; NCEL-TN-1839) Avail: CASI HC A03/MF A01

The use of a high-pressure jet of cryogenic fluid (e.g., liquid nitrogen at -320 F) to remove paint and other protective coatings from Navy aircraft and ships was studied. The objective of the work was to explore the feasibility of developing a paint removal method that is less harmful to the environment than the chemical paint stripping methods presently in use. It was learned that only thick (t greater than 0.020 inch) films of paint can be effectively removed by the mechanism of thermal shock. Aircraft paint is too thin and flexible to be removed by cryogenic methods. Cryogenic methods are not recommended for use on ships because of the danger of steel embrittlement by low temperatures. It was demonstrated that a jet of liquid nitrogen can effectively remove certain paints (regardless of thickness) by the mechanism of differential thermal contraction. The process may have application where control of paint waste is essential, for example, removal of thick films of lead base paint.

N92-28921# Naval Air Development Center, Warminster, PA. Air Vehicle and Crew Systems Technology Dept.

TENSILE AND INTERLAMINAR PROPERTIES OF GLARE (TRADE NAME) LAMINATES Final Report, 1 Oct. 1990 - 1 Jul. 1991

JEFFREY COOK and MARY E. DONNELLAN 1 Sep. 1991 24 p

(AD-A250188; NADC-91087-60) Avail: CASI HC A03/MF A01

The mechanical properties of several GLARE laminates were investigated as part of an AKZO-coordinated round robin evaluation program. Tensile, floating roller peel, and three-point bend tests were performed on GLARE to determine its tensile properties, peel strength, and interlaminar shear strength, respectively.

Strength, elongation to failure, and elastic modulus of the GLARE configurations tested in tension compared favorably to ARALL-4 and monolithic 2024-T3. Peel strength of ARALL-4 was found to be very low in the longitudinal fiber direction due to uninhibited crack front propagation along the fiber/adhesive layer interface. The peel strength of GLARE was found to be ten times higher than for ARALL in the longitudinal direction. Three point bend tests revealed an interlaminar shear strength of over 70 MPa.

GRA

N92-29408# Pratt and Whitney Aircraft, West Palm Beach, FL. Government Engines and Space Propulsion.
FATIGUE IN SINGLE CRYSTAL NICKEL SUPERALLOYS
Technical Progress Report, 16 Feb. - 15 Mar. 1992

DANIEL P. DELUCA and CHARLES ANNIS 15 Mar. 1992 10 p

(Contract N00014-91-C-0124)

(AD-A248190; PW/GESP-FR2198-05) Avail: CASI HC A02/MF A01

This program investigates the seemingly unusual behavior of single crystal airfoil materials. The fatigue initiation processes in single crystal (SC) materials are significantly more complicated and involved than fatigue initiation and subsequent behavior of a (single) macrocrack in conventional, isotropic, materials. To understand these differences is the major goal of this project.

GRA

N92-29580# California Inst. of Tech., Pasadena.
SHOCK ENHANCEMENT AND CONTROL OF HYPERSONIC
COMBUSTION Annual Technical Report, 1 Apr. 1990 - 30 Mar.
1991

FRANK E. MARBLE 26 Nov. 1991 17 p (Contract AF-AFOSR-0188-90; AF PROJ. 2308)

(AD-A248558; AFOSR-92-0238TR) Avail: CASI HC A03/MF A01 Shock tube studies of shock enhanced mixing of helium into air were reported utilizing the Rayleigh scattering technique. Because of their greater sensitivity in the low concentration range, these measurements were believed to be more accurate than those obtained with laser induced fluorescence. The result indicated that mixing was more rapid and more complete than reported previously. Preliminary work on the consequence of multiple shocks has been promising. Work began on the interaction of shock induced mixing with shear layers in the GALCIT M = 2.5 supersonic wind tunnel. Experiments concerning the details of combustion in large vortices in the Caltech Unsteady Combustion Facility

12

progressed very well using simultaneous measurements of

pressure, shadowgraphy, and chemiluminescence. These results

reveal a very different ignition mechanism and combustion pattern

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.

A92-44967

than had been anticipated.

PERSPECTIVE VERSUS PLAN VIEW AIR TRAFFIC CONTROL (ATC) DISPLAYS - SURVEY AND EMPIRICAL RESULTS

MERÍDYTH S. BURNETT and WOODROW BARFIELD (Washington, University, Seattle) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 448-453. refs

Results are presented of two preliminary display designs (plan view and perspective) employed for the purpose of extracting and

analyzing specific user requirements from which specifications could be applied to design a 3D, color-coded, dynamic, perspective ATC display. These results provide evidence that critical trade-offs exist in the design of ATC systems in terms of human interface design, 3d symbology, information presentation and form, color-coded design, human-machine design, and user performance. Examining the performance benefits of utilizing 3D computer graphics, modeling and simulation tools, and color-coded symbology for designing radar displays is necessary to providing complete ATC systems that enable controllers to accomplish ATC tasks efficiently, expeditiously and safely.

A92-45130

SIMULTANEOUS IMAGING AND INTERFEROMETRIC TURBULE VISUALIZATION IN A HIGH-VELOCITY MIXING/SHEAR LAYER

D. A. KALIN, D. A. SAYLOR (Teledyne Brown Engineering, Huntsville, AL), and T. STREET (U.S. Army, Strategic Defense Command, Huntsville, AL) IN: International Congress on High-Speed Photography and Photonics, 19th, Cambridge, England, Sept. 16-21, 1990, Proceedings. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 780-787. refs (Contract DASG60-87-C-0042) Copyright

A single-jet supersonic mixing/shear layer simulator in which two high speed video data acquisition systems simultaneously sample the flow region has been used to characterize the structure of turbulence in a high-speed mixing/shear layer and its degradation effect on an optical test beam. The experiment imaged a point source through the flow field. Correlations are shown to exist between the turbulent structure of the flow field and specific aerooptic distortions, offering the foundations for real time error correction of optical degradations associated with hypersonic flight.

O.C.

A92-45202

SWIRL NUMBER EFFECTS ON CONFINED FLOWS IN A MODEL OF A DUMP COMBUSTOR

A. S. NEJAD, S. A. AHMED, and R. S. BORAY (USAF, Aero Propulsion and Power Laboratory, Wright-Patterson AFB, OH) IN: ICALEO '89 - Optical methods in flow and particle diagnostics; Proceedings of the Meeting, Orlando, FL, Oct. 15-20, 1989. Orlando, FL/Bellingham, WA, Laser Institute of America/Society of Photo-Optical Instrumentation Engineers, 1989, p. 1-17. Research supported by USAF. refs

The results of an experimental investigation of isothermal swirling flows in a model of a coaxial dump combustor are presented. A set of three constant angle swirlers were designed and fabricated for this aspect of the study. A two component LDV system was used to obtain the velocity measurements of the flowfield. The detailed data base is provided for the development of turbulent closure models and the CFD code validation for the ramjet or turbojet applications. The results show the effects of the swirl strength on the flow characteristics, enhanced turbulent mixing and the resulting shortened corner recirculation zone.

Author

A92-45226

ADVANCES IN FATIGUE LIFETIME PREDICTIVE TECHNIQUES; PROCEEDINGS OF THE SYMPOSIUM, SAN FRANCISCO, CA, APR. 24, 1990

M. R. MITCHELL, ED. (Rockwell International Corp., Thousand Oaks, CA) and R. W. LANDGRAF, ED. (Virginia Polytechnic Institute and State University, Blacksburg) Research sponsored by ASTM. Philadelphia, PA, American Society for Testing and Materials, 1992, 494 p. For individual items see A92-45227 to A92-45244. (ASTM STP-1122; ISBN 0-8031-1423-0) Copyright

Recent progress in the development of methods to predict fatigue performance of materials and structures is reviewed. Attention is given to general approaches to fatigue mechanics, elevated temperature phenomena, spectrum loading, the multiaxial behavior, and applications. Particular attention is given to a

fracture-mechanics-based model for cumulative assessment, thermo-mechanical fatigue life prediction methods, a probabilistic fracture mechanics approach for structural reliability assessment of space flight systems, a multiaxial fatique life estimation technique, plasticity and fatigue damage modeling of severely loaded tubing, damage evaluation in composite materials using thermographic stress analysis, and fatigue lifetime monitoring in power plants.

A92-45242

RELIABILITY CENTERED MAINTENANCE FOR METALLIC AIRFRAMES BASED ON A STOCHASTIC CRACK GROWTH **APPROACH**

S. D. MANNING (General Dynamics Corp., Fort Worth Div., TX), J. N. YANG (California, University, Irvine), F. L. PRETZER, and J. E. MARLER (General Dynamics Corp., Fort Worth Div., TX) IN: Advances in fatigue lifetime predictive techniques; Proceedings of the Symposium, San Francisco, CA, Apr. 24, 1990. Philadelphia, PA, American Society for Testing and Materials, 1992, p. 422-434. refs Copyright

A reliability centered maintenance analysis (RCMA) method is proposed for metallic airframes. The method is aimed at evaluating preventive maintenance inspection requirements, options, and tradeoffs, in terms of risk, for protecting metallic aircraft structure against the consequences of fatigue cracking. The RCMA method takes into account crack growth life dispersion, statistical crack growth in multiple structural details, the conditional probability of a Class A mishap, allowable risk rates, and crack size detection limits.

A92-45260

STUDY OF GRINDING PROCESS AND STRENGTH FOR **CERAMIC HEAT INSULATED ENGINE**

HIDEO KAWAMURA (Isuzu Ceramics Research Institute Co., Ltd., Fujisawa, Japan) Society of Manufacturing Engineers, Superabrasives'91 Conference, Chicago, IL, June 11-13, 1991. 19

(SME PAPER MR91-177) Copyright
Steps are described for the successful development of a ceramic thermally insulated turbine engine. The strength of the ceramic engine parts can be effectively increased depending on the grinding methods used. Because many microcracks have been observed after the grinding of engine parts with low strength, grinding processes are, therefore, studied. Since wear resistance, abrasion resistance, and low friction are the principal factors required of reciprocating engines, machining precision of these engines' sliding parts largely affects their abrasion and friction properties. Structural analysis means are discussed to estimate the mechanical and thermal stresses acting on all the ceramic components. Experimental results are discussed with regard to the workability of two types of Si3N4. It is shown that as machining efficiency improves, the affected laver increases for baking both at atmospheric pressure and at high pressure. Comparisons of strength properties are made for the Si3N4 materials under both baking conditions. S.A.V.

A92-45261 HIGH REYNOLDS NUMBER FLOWS USING LIQUID AND

GASEOUS HELIUM

RUSSELL J. DONNELLY, ED. (Oregon, University, Eugene) Research supported by U.S. Navy. New York, Springer-Verlag, 1991, 280 p. For individual items see A92-45262 to A92-45275. (ISBN 0-387-97475-X) Copyright

Consideration is given to liquid and gaseous helium as test fluids, high Revnolds number test requirements in low speed aerodynamics, the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF, water tunnels, flow visualization, the six component magnetic suspension system for wind tunnel testing, and recent aerodynamic measurements with magnetic suspension systems. Attention is also given to application of a flow visualization technique to a superflow

experiment, experimental investigations of He II flows at high Reynolds numbers, a study of homogeneous turbulence in superfluid helium, and thermal convection in liquid helium.

A92-45403

PRELIMINARY STUDY OF ALGORITHM FOR REAL-TIME **FLUTTER MONITORING**

KATSUHIKO SHIBATA and KATSUYA MATSUZAKI (Mitsubishi Heavy Industries, Ltd., Nagoya Aerospace Systems Works, IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11. 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 325-330. (SAE PAPER 912001) Copyright

This paper describes an algorithm for real-time flutter monitoring. An autoregressive (AR) model with time-varying coefficients is used for continuous monitoring of the nonstationary flutter parameters. AR coefficient change rates as well as AR coefficients can be obtained recursively by Kalman filter implementation. Using these AR coefficients and change rates, the natural frequencies and damping values of vibration modes can be estimated and predicted a few seconds ahead. This algorithm was tested on simulated data and wind tunnel test data and showed a good estimation performance. Author

A92-45416

DEMONSTRATION OF GAS LIQUID SEPARATION UNDER THE MICROGRAVITY BY AIRCRAFT KC-135

OSAMU MURAGISHI and SEIJI NISHIO (Kawasaki Heavy Industries, Ltd., Gifu Technical Institute, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 461-470.

(SAE PAPER 912024) Copyright

Verification of liquid-gas separation function of the functional tank under high-gravity by pull-up and under microgravity by parabolic flight was conducted aboard a KC-135. Video recording of liquid behavior under microgravity in the tanks that have partial structures of surface tension tank inside was performed. Experimental results with photo data, acceleration data, etc. are presented. R.E.P.

A92-45440

INTEGRATED WIRING SYSTEM

V. E. SAUCEDO (Lockheed Advanced Development Co., Burbank, CA) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 709-715.

(SAE PAPER 912058) Copyright

The Lockheed Integrated Wiring System (IWS) is presented. This computer-based system features a single-source data base that is used for all design, documentation, fabrication, and testing of aircraft wiring. This single-source data base ensures that items are manufactured to match all engineering specifications. This application of concurrent engineering minimizes the transmittal or errors, reduces the time required for design, planning and mockup, ensures a coordinated effort among the affected divisions, and provides high-quality documentation.

A92-45606

EFFECT OF FLOW RATE ON LOSS MECHANISMS IN A **BACKSWEPT CENTRIFUGAL IMPELLER**

TALIB Z. FARGE and MARK W. JOHNSON (Liverpool, University, England) International Journal of Heat and Fluid Flow (ISSN 0142-727X), vol. 13, no. 2, June 1992, p. 189-196, refs Copyright

Detailed measurements of the three velocity components, total. and static pressures on five measurement planes without a low speed shrouded backswept centrifugal impeller are presented. A comparison is made between the design flowfield and the flowfields for both below and above design flow rates. The flow is dominated by a passage vortex that rotates in the opposite direction to the impeller. This vortex develops in the inducer, is strongest in the axial to radial bend, and then decays toward the outlet. The vortex is also most prominent at the lowest flow rate and is responsible for stabilizing the shroud boundary layer and hence reducing the large losses associated with the separation of this boundary layer in radial impellers. At the outlet, the wake is located on the shroud at all flow rates, but tends to be spread more evenly across the shroud than is the case in a radial machine. The impeller efficiency is also generally found to be spread more evenly across the shroud than is the case in a radial machine. The impeller efficiency is also generally found to be higher at lower flow rates in contrast to observations for radial impellers.

A92-45774 ISODOPPLER AND MOCOMP CORRECTIONS IMPROVE MTI RADAR

ALLAN NIRENBERG (Horizons Technology Corp., Melbourne, FL) and JOSEPH EDIE (Grumman Corp., Melbourne, FL) Microwaves & RF (ISSN 0745-2993), vol. 31, no. 6, June 1992, p. 117, 118, 120. Research supported by USAF.

Copyright

A moving-target-indicating (MTI) radar which uses Doppler signal to distinguish moving targets from stationary background clutter is described. In airborne MTI radar where the radar platform is also moving, both motion-compensation (mocomp) and isoDoppler corrections must be made on returned radar signals using phased-array antennas to ensure that only the true target Doppler information is extracted by the signal processing functions. O.G.

A92-45826 EIGENFUNCTION ANALYSIS OF TURBULENT MIXING PHENOMENA

M. WINTER, T. J. BARBER (United Technologies Research Center, East Hartford, CT), R. M. EVERSON, and L. SIROVICH (Brown University, Providence, RI) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1681-1688. Research supported by DARPA. Previously cited in issue 07, p. 1038, Accession no. A91-21519. refs

(Contract N00014-86-K-0754) Copyright

Copyrigin

A92-45833

EFFECT OF A BULGE ON THE SUBHARMONIC INSTABILITY OF SUBSONIC BOUNDARY LAYERS

J. A. MASAD and A. H. NAYFEH (Virginia Polytechnic Institute and State University, Blacksburg) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1731-1737. refs (Contract N00014-85-K-0011)

Copyright

The effect of a two-dimensional hump on the three-dimensional subharmonic instability of subsonic flow over a flat plate was investigated. The mean flow was calculated by using interacting boundary layers, thereby accounting for viscid/inviscid interactions and capturing separation bubbles. The results show that increasing the hump height produces an increase in the amplification factors of both the primary and subharmonic waves. When the hump causes separation, the growth rates of both the primary and subharmonic waves are considerably larger than those in the case of no separation. The effect of compressibility on reducing the amplification factors of the primary and subharmonic waves decreases as the hump height increases.

A92-45883* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THE EFFECT OF MOLECULAR RELAXATION PROCESSES IN AIR ON THE RISE TIME OF SONIC BOOMS

JONGMIN KANG and ALLAN D. PIERCE (Pennsylvania State University, University Park) IN: International Congress on Recent Developments in Air- and Structure-Borne Sound and Vibration, Auburn, AL, Mar. 6-8, 1990, Proceedings. Vol. 1. Auburn, AL, Auburn University, 1990, p. 97-104. Research supported by NASA. refs Copyright

A theory is developed to explain the effect of molecular relaxation processes on the rise time of sonic booms. To determine the rise time of sonic booms, both O2 and N2 relaxation processes must be included. The N2 relaxation process delays the shock pressure reaching the maximum pressure, and the O2 relaxation process causes a shock profile to have a gentle slope. The N2 relaxation controls the lower part of overpressure; the O2 relaxation controls the higher part. The constant rise time curves show that the rise times increase as the overpressures and humidity decrease. The present approach gives longer rise times than those acquired by Bass et al. for given shock overpressures.

A92-45885

RITZ VECTORS SYNTHESIS VERSUS MODAL SYNTHESIS FOR FLUID-STRUCTURE INTERACTION MODELING

J. P. COYETTE (Dynamic Engineering, Saint Louis, MO) IN: International Congress on Recent Developments in Air- and Structure-Borne Sound and Vibration, Auburn, AL, Mar. 6-8, 1990, Proceedings. Vol. 1. Auburn, AL, Auburn University, 1990, p. 115-126. refs
Copyright

The problem of forced response in the frequency domain of fluid-structure interaction is addressed. It is shown that the conventional two-field formulation and a special Ritz vectors procedure can be used to solve the interaction problem efficiently and accurately. Symmetry is preserved using accelerations instead of displacements to describe the structural behavior.

C.D.

A92-46252

THREE-DIMENSIONAL-MODE RESONANCE IN FAR WAKES

T. C. CORKE, J. D. KRULL, and M. GHASSEMI (Illinois Institute of Technology, Chicago) Journal of Fluid Mechanics (ISSN 0022-1120), vol. 239, June 1992, p. 99-132. refs (Contract N00014-90-J-1420) Copyright

This work is aimed at understanding mechanisms which govern the growth of secondary 3D modes of a particular type which feed from a resonant energy exchange with the primary Karman instability in 2D wakes. The approach was to introduce controlled time-periodic 3D (oblique) wave pairs of equal but opposite sign, simultaneously with a 2D wave. The waves were introduced by an array of v-component-producing elements on the top and the bottom surfaces of the body. These were formed by metallized electrodes which were vapor deposited onto a piezoelectrically active polymer wrapped around the surface. The amplitudes, streamwise and spanwise wavenumbers, and initial phase difference are all individually controllable. The initial work focused on a fundamental/subharmonic interaction, and the dependence on spanwise wavenumber. The results include mode eigenfunction modulus and phase distributions in space, and stream functions for the phase-reconstructed flowfield. Analysis of these shows that such a resonance mechanism exists and its features can account for characteristic changes associated with the growth of 3D structures in the wake of 2D bodies. Author

A92-46498

MAGNETIC PARTICLE TESTING OF TURBINE BLADES MOUNTED ON THE TURBINE ROTOR SHAFT

CLEMENT IMBERT (University of West Indies, St. Augustine, Trinidad and Tobago) and KRISHNA RAMPERSAD (Trinidad and Tobago Electricity Commission, Port-of-Spain) Journal of Testing and Evaluation (ISSN 0090-3973), vol. 20, no. 4, July 1992, p. 296-300. refs

Copyright

An outline is presented of the general technique of magnetic particle inspection (MPI) of turbine blades mounted on the turbine rotor shaft with specific reference to the placement of the magnetizing coils. In particular, this study reports on the use of MPI in the examination of martensitic stainless steel turbine blades in power plants in Trinidad and Tobago in order to establish procedures for the detection of discontinuities. The techniques described are applicable to ferromagnetic turbine blades in general. The two practical techniques mentioned are the method of placing

a preformed coil over a number of blades in one row and the method of wrapping the coil around the rotor shaft across an entire row of blades. Of the two methods, the former is preferred to the latter one, because there is greater uniformity of magnetic flux induced and lower current required to induce adequate flux density with the preformed coil. However, both methods provide satisfactory magnetic flux, and either can be used.

S.A.V.

A92-46801 APPROACH FOR ANALYSIS AND DESIGN OF COMPOSITE ROTOR BLADES

GERALDO A. MACEDO MAURA (Centro Tecnico Aerospacial, Sao Jose dos Campos, Brazil) and RAMESH KOLAR (U.S. Naval Postgraduate School, Monterey, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 693-697. Previously cited in issue 11, p. 1694, Accession no. A90-29276. refs

A92-46825

THE APPLICATION OF PARTICLE IMAGE VELOCIMETRY (PIV) IN A SHORT-DURATION TRANSONIC ANNULAR TURBINE CASCADE

P. J. BRYANSTON-CROSS, C. E. TOWERS, T. R. JUDGE, D. P. TOWERS (Warwick, University, Coventry, England), S. P. HARASGAMA, and S. T. HOPWOOD (Royal Aerospace Establishment, Propulsion Dept., Farnborough, England) ASME, Transactions, Journal of Turbomachinery (ISSN 0889-504X), vol. 114, no. 3, July 1992, p. 504-509. Previously announced in STAR as N91-28504. refs

(ASME PAPER 91-GT-221) Copyright

A series of experiments was performed to demonstrate the application of Particle Image Velocimetry to turbomachinery flows. The tests were performed at transonic speeds on a fully annular engine size turbine nozzle guide vane. The vane cascade was installed in a short duration Isentropic Light Piston Cascade (ILPC) test facility operating with high inlet turbulence levels. The technique was shown to map the whole flow field with a resolution of 0.5 mm. The quality of the results obtained are not greatly affected by local turbulence rates. The accuracy of the measurements is put at around 4 pct. of absolute velocity and is limited by the quality of the image on the film plane. The velocities derived from the PIV images were compared with predictions from a 3-D viscous numerical calculation. It is shown that the experimental and predicted results are in good agreement. It is considered that this technique has considerable potential in application to turbomachinery flow field diagnostics. Author

A92-46916

TAYLOR SERIES APPROXIMATION OF GEOMETRIC SHAPE VARIATION FOR THE EULER EQUATIONS

ARTHUR C. TAYLOR, III, VAMSHI M. KORIVI, and GENE W. HOU (Old Dominion University, Norfolk, VA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 8, Aug. 1992, p. 2163-2165. refs (Contract NSF DMC-86-57917) Copyright

A linear approximate analysis scheme for the Euler equations which focuses on the treatment of geometric-shape variations is presently implemented and tested, with a view to CFD applications in design software. The effectiveness of the use of slopes to accurately predict changes occurring in the field variables of flow problem in response to small changes in geometric shape is confirmed. A brief comparative study of CPU times indicates the potential for substantial computational reductions in design-oriented CFD.

O.C.

A92-46936

LINEAR ANALYSIS OF NATURALLY CURVED AND TWISTED ANISOTROPIC BEAM

MARCO BORRI, GIAN L. GHIRINGHELLI, and TEODORO MERLINI (Milano, Politecnico, Milan, Italy) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 42-1 to 42-15. Research supported by U.S. Army. refs

The determination of the governing equations of a naturally

curved and twisted anisotropic beam is presently addressed by a model which takes into account all elastic couplings due to the material and the curved geometry, under the assumption of uniformity in cross-section, curvature and twist. While requiring only a 2D approximation, a degree of detail is achieved which would be unrealistic in a 3D approach. The FEM of the beam cross section furnishes a useful mathematical tool for the tailoring of practical helicopter rotor blade designs.

A92-46940

BUCKLING, POSTBUCKLING AND CRIPPLING OF THIN WALLED COMPOSITE AIRFRAME STRUCTURES UNDER COMPRESSION

LEVEND PARNAS, ERIAN A. ARMANIOS, and P. SRIRAM (Georgia Institute of Technology, Atlanta) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 46-1 to 46-8. refs

This paper presents an analytical and experimental study conducted for thin-walled stiffeners. The stiffener configuration is an I-beam section composed of plate element subjected to remote compression. A quantitative model is developed to determine the postbuckling and crippling strength. The method leads to a criterion for a mode of failrue in thin-walled composite stiffeners. This mode is local material failure which initiates in corners or junctures between contiguous elements and extends across webs. The criterion yields a linear relationship between buckling and crippling loads. Experimental crippling results show good agreement with predictions based upon the new criterion.

A92-46946

DYNAMIC ANALYSIS OF ROTOR FLEX-STRUCTURE BASED ON NONLINEAR ANISOTROPIC SHELL MODELS

OLIVIER A. BAUCHAU and WUYING CHIANG (Rensselaer Polytechnic Institute, Troy, NY) IN: AHS International Specialists' Meeting on Rotorcraft Basic Research, Atlanta, GA, Mar. 25-27, 1991, Proceedings. Alexandria, VA, American Helicopter Society, 1991, p. 21-1 to 21-11. Research supported by Chung Shan Institute of Science and Technology. refs

In this paper an anisotropic shallow shell model is developed that accommodates transverse shearing deformations and arbitrarily large displacements and rotations, but strains are assumed to remain small. Two kinematic models are developed, the first using two DOF to locate the direction of the normal to the shell's midplane, the second using three. The latter model allows for an automatic compatibility of the shell model with beam models. The shell model is validated by comparing its predictions with several benchmark problems. In actual helicopter rotor blade problems, the shell model of the flex structure is shown to give very different results shown compared to beam models. The lead-lag and torsion modes in particular are strongly affected, whereas flapping modes seem to be less affected.

A92-46996#

LASER VELOCIMETRY MEASUREMENTS IN AN MHD AERODYNAMIC DUCT

A. GEORGE, W. W. WILSON, and ROBERT L. COOK (Mississippi State University, Mississippi State) AIAA, Plasmadynamics and Lasers Conference, 23rd, Nashville, TN, July 6-8, 1992. 7 p. refs

(AIAA PAPER 92-2986) Copyright

Fluid flow profile measurements made by a laser Doppler velocimeter just downsteam of the combustor nozzle at the DOE Coal-Fired Flow Facility at the University of Tennessee Space Institute are described. Attention is given to a proof-of-concept test program consisting of long-duration coal-fired tests of equipment that is envisioned for use in an MHD power system. A combination of high velocities, intense background radiation, small particle sizes, and a small-diameter collection aperture resulted in low amplitude signal bursts. A forward scatter detection configuration would significantly improve signal quality for these measurement conditions.

A92-47071

EFFECT OF THE GRID SYSTEM ON HEAT TRANSFER COMPUTATIONS FOR HIGH SPEED FLOWS

KLAUS A. HOFFMANN (Wichita State University, KS), M. S. SIDDIQUI (Texas, University, Austin), and WALTER H. RUTLEDGE (Sandia National Laboratories, Albuquerque, NM) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 569-578. Previously announced in STAR as N91-25375. refs (Contract DE-AC04-76DP-00789)

Copyright

Difficulties in the accurate heat transfer computation of high speed, blunt body flows have been encountered by numerous researchers. The primary reason for these difficulties has been shown to be the grid dependency of the wall flux quantities. Obviously, the accuracy of the computed heat fluxes will, to a certain extent, depend on the particular numerical scheme employed. The flux vector splitting technique is studied. An attempt was made to develop procedures which will provide guidelines for selecting appropriate grid systems and, in particular, the grid line distribution near the surface for accurate heat transfer computations. The results have clearly shown the dependency of the heat flux quantities on the grid system. In addition, it is shown that changes in flow Mach number and/or Reynolds number may require further refinement of the grid system.

A92-47128* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SENSITIVITY OF TIRE RESPONSE TO VARIATIONS IN MATERIAL AND GEOMETRIC PARAMETERS

AHMED K. NOOR, JOHN A. TANNER, and JEANNE M. PETERS (Virginia, University; NASA, Langley Research Center, Hampton) Finite Elements in Analysis and Design (ISSN 0168-874X), vol. 11, no. 1, May 1992, p. 77-86. refs (Contract NAG1-1180)

Copyright

A computational procedure is presented for evaluating the analytic sensitivity derivatives of the tire response with respect to material and geometric parameters of the tire. The tire is modeled by using a two-dimensional laminated anisotropic shell theory with the effects of variation in material and geometric parameters included. The computational procedure is applied to the case of uniform inflation pressure on the Space Shuttle nose-gear tire when subjected to uniform inflation pressure. Numerical results are presented showing the sensitivity of the different response quantities to variations in the material characteristics of both the cord and the rubber.

A92-47176

PERFORMANCE OF HYBRID BALL BEARINGS IN OIL AND JET FUEL

STEPHEN M. SCHRADER and EUGENE E. PFAFFENBERGER (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) (STLE, Annual Meeting, 45th, Denver, CO, May 7-10, 1990) STLE Tribology Transactions (ISSN 0569-8197), vol. 35, no. 3, July 1992, p. 389-396. refs

Copyright

A 308-size hybrid ball bearing, with ceramic balls and steel rings, was tested using a diester oil and gas turbine fuel as lubricants at several speeds and loads. Heat generation data from this test work was then correlated with the heat generation model from a widely used computer code. The ability of this hybrid split inner ring bearing design to endure thrust reversals, which are expected in many turbine applications, was demonstrated. Finally, the bearing was successfully endurance tested in JP-10 fuel for 25 hours at 7560 N axial load and 36,000 rpm. This work has successfully demonstrated the technology necessary to use fuel-lubricated hybrid bearings in limited-life gas turbine engine applications such as missiles, drones, and other unmanned air vehicles (UAVs). In addition, it has provided guidance for use in designing such bearing systems. As a result, the benefits of

removing the conventional oil lubricant system, i.e., design simplification and reduced maintenance, can be realized. Author

A92-47188

MAGNETIC BEARING DESIGN AND CONTROL OPTIMIZATION FOR A FOUR-STAGE CENTRIFUGAL COMPRESSOR

FRANK D. PINCKNEY and JOHN M. KEESEE (Magnetic Bearings, Inc., Radford, VA) (STLE and ASME, Tribology Conference, Saint Louis, MO, Oct. 14-16, 1991) STLE Tribology Transactions (ISSN 0569-8197), vol. 35, no. 3, July 1992, p. 561-565. refs Copyright

A four-stage centrifugal pipeline compressor with a flexible rotor was equipped with magnetic bearings. Magnetic bearing sizing, shaft rotor dynamics, and controller/bearing design are discussed. Controller changes during shop and field tuning and the resulting rotor dynamic effects are also presented. Results of the field operation of this compressor indicate no vibration-related problems, despite the shaft second and third undamped modes being within the operating speed range. During the first 14 months after field commissioning, 9900 operating hours had been accumulated, indicating a 97 percent unit availability.

Author

A92-47267

SEGMENTAL HEAT TRANSFER IN A PIN FIN CHANNEL WITH EJECTION HOLES

S. C. LAU, R. D. MCMILLIN, and R. T. KUKREJA (Texas A & M University, College Station) International Journal of Heat and Mass Transfer (ISSN 0017-9310), vol. 35, no. 6, June 1992, p. 1407-1417. refs

(Contract NSF CBT-87-13833)

Copyright

An experimental investigation has been conducted to study, for turbulent air flow through a pin fin channel with ejection holes, the effects of varying the ejection hole configuration on the distribution of the regionally-averaged heat transfer and the overall pressure drop. The channel models the internal cooling passages near the trailing edges of rotor or stator blades in modern gas turbune engines. When air exits through ejection holes, the segmental heat transfer decreases much faster with increasing distance from the channel entrance and the overall channel pressure drop is lower than in the straight-flow-only case. Increasing the number of ejection holes and increasing the size of the ejection holes lower the distribution of the segmental heat transfer and the overall pressure drop.

A92-47412

TOOLING FOR C-17 COMPOSITE PARTS

NANCY M. HAM (Ciba-Geigy Formulated Systems Group, Lansing, MI) IN: Composites in manufacturing - Case studies. Dearborn, MI, Society of Manufacturing Engineers, 1991, p. 149-164. refs Convright

The fabrication of tooling for manufacturing composite components for the C-17 cargo transport is discussed. The discussion covers an analysis of the most common methods of fabricating tooling, the use of different tool-making techniques for different parts of the C-17, selection of tooling materials and appropriate tests, and C-17 composite tooling sequences. It is shown that the use of CAD/CAM techniques makes it possible to reduce the number of steps in typical composite tooling sequences.

A92-47528

24-BIT FLIGHT TEST DATA RECORDING FORMAT

H. L. MILLS and K. D. TURVER (Boeing Commercial Airplane Group, Seattle, WA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 385-389.

Copyright

Boeing Commercial Airplane Group's Flight Test Engineering organization is developing a new test data recording format to be used on the new model 777 airplane. ARINC 429, ARINC 629 and IRIG PCM data will be formatted for recording test data. The

need to support a variety of data recorders, and three types of data, mandate the development of a new recording format. The format Flight Test chosen is a variation of IRIG Standard 106-86, Chapter 8. The data from each channel is treated as a data packet, including time and channel ID, and then multiplexed into 24 bits. This allows a time accuracy of 10 microseconds and a minimum latency caused by multiplexing.

Author

A92-47656

A METHOD OF FAILURE ANALYSIS OF COMPLICATED STRUCTURES

JIAN-QIU WEI Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A128-A132. In Chinese. refs

A method of failure analysis of complex structures is developed. It is shown that, in order to solve unsymmetrical failure problems for complex structures by the semimodel, it must be assumed that the original rigidity of the structure remains constant and that the equivalent additional force is a substitute for the rigidity effect of the failure elements. The failure analysis method is simple and economical and can be applied to analyze designs, improvements, and failures of a variety of structures.

A92-47663

A STUDY ON CRACK INITIATION METHOD FOR DURABILITY ANALYSIS

WEN-TING LIU and JUN-JIANG XIONG (Beijing University of Aeronautics and Astronautics, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A182-A186. In Chinese. refs

A crack initiation method for durability analysis is developed. In this method, the reliability of safe life under load is related to the crack exceedance probability, on the basis of P-S-N curves for structure member initiation. The condition is that the crack length reaches economic repairment limit. A simple example is presented.

A92-47671

APPROXIMATE ANALYSIS FOR FAILURE PROBABILITY OF STRUCTURAL SYSTEMS

YIN-LIN CAI and JIAN-SHENG ZHOU (Harbin Shipbuilding Engineering Institute, People's Republic of China) Acta Aeronautica et Astronautica Sinica (ISSN 1000-6893), vol. 13, no. 3, March 1992, p. A219-A222. In Chinese. refs

An approximate formula for calculating failure probability of structural systems is presented, which uses the lower and upper bounds of the first simple bounds to estimate the failure probability. In this formula, the correlation between each of the two failure modes of a structure is considered, but only the first failure probability of the failure modes is contained. Computations using the approximate formula are quite simple and accurate, with maximum error being within 5 percent.

A92-47853#

EXAMINATION OF ULTRAVIOLET RADIATION THEORY FOR BOW SHOCK ROCKET EXPERIMENTS

DEBORAH A. LEVIN (Institute for Defense Analyses, Alexandria, VA), GRAHAM V. CANDLER (North Carolina State University, Raleigh), ROBERT J. COLLINS (Minnesota, University, Minneapolis), PETER W. ERDMAN, EDWARD C. ZIPF (Pittsburgh, University, PA), and CARL L. HOWLETT (Utah State University, Logan) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 13 p. refs

(AIAA PAPER 92-2871) Copyright

Comparison is made between the results from a modified state-of-the-art radiation code and bow shock radiation data from recent flight experiments. Initial predictions of the radiation did not yield satisfactory comparison with the first flight experiment, flown at 3.5 km/sec between altitudes of 40 and 70 km, despite improvements to the original flow model. It is found that characterizing the NO excited state population with the translational temperature, rather than the vibrational temperature, yields better comparison to the flight data. Comparison of bow shock data

from the second flight, flown at 5.1 km/sec at altitudes of 70 to 90 km, shows that modifications in either flow or radiation modeling are still needed, particularly at high altitudes. The quasi-steady-state distribution of electronic states of NO is found to be valid for these flows.

Author

A92-47913#

HEAT TRANSFER TO A CYLINDER SUBMERGED IN A RECTANGULAR CAVITY IN SUPERSONIC FLOW

RANDAL W. LYCANS (United Technologies Corp., Huntsville, AL) and C. I. STUCKEY (Remtech, Inc., Huntsville, AL) AIAA, Thermophysics Conference, 27th, Nashville, TN, July 6-8, 1992. 9 p. refs

(AIAA PAPER 92-2949) Copyright

A study is described which is aimed at determining the convective heat transfer to a cylinder submerged in an open cavity in supersonic flow. The test apparatus was designed to simulate electrical cables routed through the external tank attach ring of the Space Shuttle's solid rocket booster. Three different tube diameters were tested at one location, forward of the recommpression face of the cavity. Peak heat fluxes on the models are found to be in the range from 60 to 80 percent of the approaching flat plate heat flux, depending on the tube diameter. The controlling parameter appears to be the distance from the recompression face of the cavity, which determines the position in the vortex present at this location.

A92-48026* National Aeronautics and Space Administration, Washington, DC.

FIBER OPTIC AND LASER SENSORS VIII; PROCEEDINGS OF THE MEETING, SAN JOSE, CA, SEPT. 17-19, 1990

RAMON P. DEPAULA, ED. (NASA, Washington, DC) and ERIC UDD, ED. (McDonnell Douglas Electronic Systems Co., Huntington Beach, CA) Meeting sponsored by SPIE. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers (SPIE Proceedings. Vol. 1367), 1991, 395 p. For individual items see A92-48027 to A92-48058.

(SPIE-1367; ISBN 0-8194-0428-4) Copyright

This issue presents topics on the advances in fiber-optic sensor technology, fiber-optic gyroscope, fiber-optic position and pressure sensors, fiber-optic magnetic and temperature sensors, and generic fiber-optic sensors. Papers included are on a novel analog phase tracker for interferometric fiber-optic sensor applications, recent development status of fiber-optic sensors in China, the magnetic-field sensitivity of depolarized fiber-optic gyros, a depolarized fiber-optic gyro for future tactical applications, fiber-optic position transducers for aircraft controls, and a metal embedded optical-fiber pressure sensor. Attention is also given to a fiber-optic magnetic field sensor using spectral modulation encoding, a bare-fiber temperature sensor, an interferometric fiber-optic accelerometer, improvement of specular reflection pyrometer, a theoretical analysis of two-mode elliptical-core optical fiber sensors, and a fiber probe for ring pattern.

A92-48201

ACTIVE MAGNETIC BEARINGS GIVE SYSTEMS A LIFT

LEO O'CONNOR Mechanical Engineering (ISSN 0025-6501), vol. 114, no. 7, July 1992, p. 52-57. Copyright

While the active magnetic bearings currently being used in such specialized applications as centrifugal compressors for natural gas pumps are more expensive than conventional bearings, they furnish improved machine service life, controlled damping of high-speed rotors to eliminate critical-speed vibrations, and the obviation of lubrication systems. Attention is presently given to magnetic bearings used by the electric power industry, homopolar magnetic radial and thrust bearings, weapon-system and gas turbine engine applications of magnetic bearings, and the benefits of magnetic bearings for energy-storage flywheels.

A92-48353

THE OPTIMIZATION OF VARIABLE CROSS-SECTION SPINES WITH TEMPERATURE DEPENDENT THERMAL PARAMETERS

J. REARDON and A. RAZANI (New Mexico, University, Albuquerque) International Communications in Heat and Mass Transfer (ISSN 0735-1933), vol. 19, no. 4, July-Aug. 1992, p. 549-557. refs Copyright

An optimization method based on a temperature correlated profile is expanded upon for the optimization of pin fins with variable cross-sections including the temperature dependence of thermal parameters. The application of this method to optimization of fin arrays is discussed. The validity of the optimization method for a single fin is demonstrated by comparison to analytical results of a special case. An example demonstrates the importance of considering temperature dependence of thermal parameters when optimizing a heat sink.

Author

A92-48354

THE EFFECT OF TIP CONVECTION ON THE PERFORMANCE AND OPTIMUM DIMENSIONS OF COOLING FINS

K. LAOR and H. KALMAN (Negev, University, Beersheba, Israel) International Communications in Heat and Mass Transfer (ISSN 0735-1933), vol. 19, no. 4, July-Aug. 1992, p. 569-584. refs Copyright

A general heat balance differential equation for straight and annular fins with rectangular, triangular, and parabolic shapes has been solved numerically. It is found that the effect of tip convection significantly affects the fin efficiency and has almost no effect on the tip heat dissipation compared to the total heat dissipation.

O.G

A92-48446

RTOK ELIMINATION WITH TSMM

PAUL W. SWART (Unisys Corp., Eagan, MN) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 214-220.

Copyright

One of the major problems in current technology in the military environment is the identification of failures that occur in airborne electronics while on a mission that cannot be reproduced on the ground-in other words, return tested OK (RTOK). A module that monitors environmental conditions, real time, called the Time Stress Measurement Module (TSMM) is described. TSMM monitors environmental conditions affecting electronics modules and within electronic systems for test, maintenance, and AVIP purposes. The current TSMM provides for monitoring of temperatures, vibration, shock, voltage variations, and transients. The sensor data can be accessed across the PI-Bus at any time before, during, or after a mission while the module is installed, allowing an expert system to take extreme environmental conditions and predict failures or correlate that data against failures that have already occurred. The sensor data can be retained after loss of power.

A92-48448

LIQUID FLOW-THROUGH COOLING FOR AVIONICS APPLICATIONS

M. BARWICK, M. MIDKIFF, and D. SEALS (AT&T Bell Laboratories, Whippany, NJ) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 227-230.

An avionics cooling system has been developed that circulates fluid through the structural frame of its SEM-E modules. The liquid flow-through (LFT) module frame is only 100 mils thick, yet is capable of maintaining low junction and surface temperatures for modules dissipating in excess of 200 W. The module form/factor is compatible with existing SEM-E circuit board formats and connectors and features toolless, dripless, quick-disconnect removal and insertion. A prototype avionics cooling system has been developed consisting of 52 LFT modules and a parallel feed rack/manifold. Both the module and the system have demonstrated outstanding cooling efficiency, and good reliability under preliminary shock and vibration testing. Cooling tests show a significant

improvement over edge-conduction cooling. Thermal comparison tests indicate a 20 C improvement in frame surface temperature over an edge-conduction-cooled 50-W module.

A92-48460

FERROELECTRIC MEMORY EVALUATION AND DEVELOPMENT SYSTEM

DAVID W. BONDURANT (Ramtron International Corp., Colorado Springs, CO) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 308, 309. Copyright

Attention is given to the Ramtron FEDS-1, an IBM PC/AT compatible single-board 16-b microcomputer with 8-kbyte program/data memory implemented with nonvolatile ferroelectric dynamic RAM. This is the first demonstration of a new type of solid state nonvolatile read/write memory, the ferroelectric RAM (FRAM). It is suggested that this memory technology will have a significant impact on avionics system performance and reliability.

ÍΕ

A92-48465

VHDL DESIGN AND SIMULATION FOR AIRBORNE GRAPHICS GENERATION REQUIREMENTS

JERRY A. MYERS (USAF, Crew Systems Development Div., Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 342-348. refs Copyright

The author presents current and future plans of the Cockpit Integration Directorate and the Electronics Technology Directorate to develop an airborne graphics generator for future cockpits. The discussion includes plans of the Cockpit Integration Directorate to generate through current and future Air Force contracts, in cooperation with in-house research at the Cockpit Integration Directorate, a system-level VHSIC Hardware Description Language (VHDL) simulation of the airborne graphics generator. It is noted that VHDL provides an excellent platform for system-level simulations. Flight testing will be restricted to final adjustments and final concept demonstration.

A92-48592

NUMERICAL ANALYSIS OF AN ENGINE TURBINE DISK LOADED WITH A LARGE NUMBER OF THERMOMECHANICAL CYCLES

S. KRUCH (ONERA, Chatillon, France) (Complas III - International Conference on Computational Plasticity Fundamentals and Applications, 3rd, Barcelona, Spain, Apr. 6-10, 1992) ONERA, TP no. 1992-31, 1992, 13 p. refs (ONERA, TP NO. 1992-31)

A new numerical methodology, named 'cycle jump technique' for the analysis of complex behavior of structures subjected to large thermomechanical loads is developed and applied to analyze a SNECMA aircraft engine turbine disk loaded with a large number of thermomechanical cycles. The cycle jump technique, implemented in the EVPCYCL computer code, is able to avoid cycle-by-cycle computations when the variation of the local governing parameters, such as viscoplastic strain and damage, do not change significantly between cycles. The cycle jump technique calculation required over 500 cycles before reaching the stabilized cycle and being in position to analyze the state of the stresses in the critical areas of the structure, demonstrating the importance and effectiveness of the technique.

A92-48607

INDIRECT MEASUREMENTS OF CONVECTIVE FLOW BY IR THERMOGRAPHY [MESURES INDIRECTES DE FLUX CONVECTIFS PAR THERMOGRAPHIE INFRAROUGE]

A. RISTORI, J. GUERNIGOU, and J. PERUCCHINI (ONERA, Chatillon, France) (Societe Francaise des Thermiciens, Journee d'Etude sur les Problemes Radiatifs dans les Domaines

Aeronautiques et Spatiaux, Paris, France, Apr. 1, 1992) ONERA, TP no. 1992-46, 1992, 12 p. In French. Research supported by DRET. refs

(ONERA, TP NO. 1992-46)

ONERA has conducted an experimental study of the effect of buffers on heat transfer by internal convection. This study is performed with the DELPHES test facility. The heat transfer coefficients are determined by identification of thermocouple measurements and transient IR thermography measurements with theoretical results calculated from a finite-element thermal code. These experiments are also used to evaluate heat flux measurement techniques and to validate codes for fluid-mechanical calculation.

A92-48722#

THE FLOW PATTERN AND EXTERNAL HEAT TRANSFER INVESTIGATION FOR GAS TURBINE VANES END SURFACES V. A. GORELOV, V. A. MALKOV, and A. A. KHALATOV (Lyulka Engine Design Bureau, Moscow, Russia) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville,

TN, July 6-8, 1992. 4 p. (AIAA PAPER 92-3071) Copyright

Experimental investigation results of the flow pattern and heat transfer on the end surface of an curvilinear converging channel are presented in this paper. Geometry of the models used for this investigation, was characteristic of the turbine first stage vanes. Velocity profiles measurements of main and cross flowing streams with and without air blowing-out for end-surfaces film cooling have been made. The investigation of local heat transfer on the end surface different areas have been carried out. Some investigation results of the vanes-end-surface film cooling effectiveness in air supplying through annular slot, located upstream of the vanes leading edges, are presented.

A92-48734*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

MIXING IN THE DOME REGION OF A STAGED GAS TURBINE COMBUSTOR

W. A. SOWA, R. A. BRADY, and G. S. SAMUELSEN (California, University, Irvine) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs

(Contract NAG3-1124)

(AIAA PAPER 92-3089) Copyright

To lower NO(x) emissions from gas-turbine engines the effect of dome design and operational changes on the mixing quality in the fuel-rich region is studied. A statistical analysis is employed to establish the parametric sensitivity in this complex flow. A mixing-effectiveness index is defined and used to optimize the gas-species uniformity and the extent of reaction at the exit plane of the dome. Mixing effectiveness is tied to the fuel and air injection locations, the macroscale structure of the dome aerodynamics, and the level of turbulence. Increases in nozzle/air to fuel ratio, reference velocities, and the dome expansion angle increased the level of turbulence. The optimum configuration featured counter-swirling fuel and air streams and produced a strong torroidal recirculation zone, an effective spray angle of 45 degrees, and azimuthal velocities that decayed to zero inside of two duct diameters. The results underscore the system specific nature of mixing optimization.

A92-48735*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

EXPERIMENTAL STUDY OF CROSS-STREAM MIXING IN A RECTANGULAR DUCT

D. S. LISCINSKY, B. TRUE (United Technologies Research Center, East Hartford, CT), A. VRANOS (AB Research Associates, South Windsor, CT), and J. D. HOLDEMAN (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. Previously announced in STAR as N92-27652. refs (Contract NAS3-25952)

(AIAA PAPER 92-3090) Copyright

An experimental investigation of non-reacting cross-stream jet injection and mixing in a rectangular duct was conducted for application in a low emissions combustor. Planar digital imaging was used to measure concentration distributions in planes perpendicular to the duct axis. Mixing rate was measured for 45 deg slanted slot and round orifice injectors. Five areas of inquiry are discussed: (1) mixing improves continuously with increasing momentum-flux ratio; (2) given a momentum-flux ratio, there is an optimum, orifice spacing; (3) mixing is more dependent on injector geometry than mass flow ratio; (4) mixing is influenced by relative slot orientation; and (5) jet structure is different for round holes and slanted slots injectors. The utility of acquiring multipoint fluctuating properties of the flow field is also demonstrated.

Author

A92-48792#

DEVELOPMENT AND APPLICATION OF A ZONAL K-EPSILON TURBULENCE MODEL FOR COMPLEX 3-D FLOWFIELDS

J. A. LADD (McDonnell Aircraft Co., Saint Louis, MO) and L. D. KRAL (McDonnell Douglas Research Laboratories, Saint Louis, MO) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 21 p. Research supported by McDonnell Douglas Corp. refs (AIAA PAPER 92-3176) Copyright

A compressible, low Reynolds number two-equation turbulence model is applied to complex engineering problems. An upwind, implicit, factored algorithm with an optional TVD operator is used to solve both the mean-flow equations and the k-epsilon equations for three-dimensional turbulenct flow. A zonal approach is used for solution of both the mean flow variables and the turbulence variables. The zonal method allows complex geometries to be broken down into smaller blocks which are then computed sequentially. Several low Reynolds number k-epsilon models are implemented and validated for a subsonic and supersonic flat plate boundary layer. Calculations using the k-epsilon turbulence model are also presented for an axisymmetric jet plume, a supersonic combusting shear layer, a multislot ejector nozzle, and an F/A-18 forebody at high angle of attack. Comparison of the two-equation turbulence model results is made with results using algebraic turbulence models as well as experimental measurements. The two-equation turbulence model predicts better many of the flowfield characteris ics for these complex geometries when compared with the algebraic solutions.

A92-48803#

SIMPLE EFFECTIVE THICKNESS MODEL FOR CIRCULAR BRUSH SEALS

CONSTANCE A. DOWLER (USAF, Wright Laboratory, Wright-Patterson AFB, OH), RAYMOND E. CHUPP, and GLENN F. HOLLE AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs

(AIAA PAPER 92-3192)

Brush seals are being investigated as replacements for some of the labyrinth seals in gas turbine engines. A relatively simple flow model approach has been presented to generalize brush seal leakage throughout the range of test and application environments. The model uses a single parameter, effective brush thickness, to correlate flow through the seal. A revision to the flow model is presented in this paper to account for seal curvature, which is especially important for smaller diameter brush seals. The revised model has been applied to leakage flow data from five sources. The results demonstrate the utility of the flow model approach in correlating the performance of brush seals having different design geometries. The revised model is shown to effectively account for the effect of seal curvature.

A92-48844*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

HIGH SPATIAL RESOLUTION MEASUREMENTS OF RAM ACCELERATOR GAS DYNAMIC PHENOMENA

J. B. HINKEY, E. A. BURNHAM, and A. P. BRUCKNER (Washington, University, Seattle) AIAA, SAE, ASME, and ASEE,

Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 27 p. refs (Contract F08635-89-C-0196; NAG1-1288)

(AIAA PAPER 92-3244) Copyright

High spatial resolution experimental tube wall pressure measurements of ram accelerator gas dynamic phenomena are presented. The projectile resembles the centerbody of a ramjet and travels supersonically through a tube filled with a combustible gaseous mixture, with the tube acting as the outer cowling. Pressure data are recorded as the projectile passes by sensors mounted in the tube wall at various locations along the tube. Data obtained by using a special highly instrumented section of tube has allowed the recording of gas dynamic phenomena with a spatial resolution on the order of one tenth the projectile length. High spatial resolution tube wall pressure data from the three regimes of propulsion studied to date (subdetonative, transdetonative, and superdetonative) are presented and reveal the 3D character of the flowfield induced by projectile fins and the canting of the projectile body relative to the tube wall. Also presented for comparison to the experimental data are calculations made with an inviscid, 3D CFD code. Author

A92-48845#

EXPANSION TUBE EXPERIMENTS FOR THE INVESTIGATION OF RAM-ACCELERATOR-RELATED COMBUSTION AND **GASDYNAMIC PROBLEMS**

J. SRULIJES, G. SMEETS, and F. SEILER (Saint-Louis, French-German Research Institute, France) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3246) Copyright

By means of a specially devised expansion tube, it has proven possible to accelerate an explosive gas mixture to a superdetonative, ram-accelerator-type velocity without autoignition. By reducing the driver length, a gas flow of decreasing velocity was generated; this allowed detailed observations of the sub-, trans-, and superdetonative regimes to be conducted in a simple experiment. In addition to aiding ram accelerator-related research, this method will help optimize the operating parameters of 30 mm and 90 mm ram accelerator test facilities that are currently under construction.

A92-48847#

PROGRESS TOWARDS THE DEVELOPMENT OF TRANSIENT RAM ACCELERATOR SIMULATION AS PART OF THE U.S. AIR FORCE ARMAMENT DIRECTORATE RESEARCH **PROGRAM**

N. SINHA, B. J. YORK, S. M. DASH (Science Applications International Corp., Propulsion Fluid Dynamics Div., Fort Washington, PA), R. DRABCZUK (USAF, Wright Laboratory, Eglin AFB, FL), and G. E. ROLADER (Science Applications International Corp., Shalimar, FL) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 15 p. refs

(AIAA PAPER 92-3248) Copyright

This paper describes the development of an advanced CFD simulation capability in support of the U.S. Air Force Armament Directorate's ram accelerator research initiative. The state-of-the-art CRAFT computer code has been specialized for high fidelity, transient ram accelerator simulations via inclusion of generalized dynamic gridding, solution adaptive grid clustering, high pressure thermochemistry, etc. Selected ram accelerator simulations are presented which serve to exhibit the CRAFT code's capabilities and identify some of the principal research/design issues.

Author

ROTOR SUPPORT FOR THE STME OXYGEN TURBOPUMP

DAVID HALUCK, ROGER BURSEY, JR., and FRANK FERLITA (Pratt & Whitney Group, West Palm Beach, FL) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 7 p.

(AIAA PAPER 92-3282) Copyright

The rotor support for the NLS Space Transportation Main Engine (STME) oxygen turbopump is discussed. The rotor is supported by two large angular contact split inner ring ball bearings which are cooled with liquid oxygen. Lubrication is provided by the sacrificial wear of Salox-M self-lubricating composite cage material and the subsequent transfer from the rolling element to the raceway surfaces. The bearings are designed to carry both radial and axial loads. The two-ball-bearing rotor support allows startup and shutdown related transient axial loads to be handled in either direction. The paper presents diagrams of the STME oxygen turbopump, showing ball bearings, and results of ball bearing

A92-48876*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A COMPARATIVE STUDY OF SCRAMJET INJECTION STRATEGIES FOR HIGH MACH NUMBERS FLOWS

D. W. RIGGINS (Missouri-Rolla, University, Rolla), C. R. MCCLINTON, R. C. ROGERS (NASA, Langley Research Center, Hampton, VA), and R. D. BITTNER (Analytical Services and Materials, Inc., Hampton, VA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 23 p. refs

(AIAA PAPER 92-3287) Copyright

A simple method for predicting the axial distribution of supersonic combustor thrust potential is described. A complementary technique for illustrating the spatial evolution and distribution of thrust potential and loss mechanisms in reacting flows is developed. Wall jet cases and swept ramp injector cases for Mach 17 and Mach 13.5 flight enthalpy inflow conditions are numerically modeled and analyzed using these techniques. The visualization of thrust potential in the combustor for the various cases examined provides a unique tool for increasing understanding of supersonic combustor performance potential.

A92-48896#

NUMERICAL SIMULATION OF TURBINE 'HOT SPOT' **ALLEVIATION USING FILM COOLING**

DANIEL J. DORNEY and ROGER L. DAVIS (United Technologies Research Center, East Hartford, CT) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by United Technologies Corp. refs

(Contract N00014-88-C-0677)

(AIAA PAPER 92-3309) Copyright

Experimental data has shown that combustor hot streaks can lead to pressure side 'hot spots' on first stage turbine rotor blades. In previous numerical studies, it has been shown that unsteady Navier-Stokes procedures can be used to predict the rotor pressure surface temperature increase associated with these combustor hot streaks. In the current investigation, similar twothree-dimensional unsteady Navier-Stokes simulations have been performed to demonstrate the use of numerical tools in the optimization of film cooling configurations. In this study, the addition of prudently placed film cooling holes along the rotor pressure surface is shown to significantly diminish the adverse effects of the hot streak. Using a two-dimensional Navier-Stokes procedure, a parametric study was performed to determine the impact of the location of the film cooling holes, fluid injection velocity, and fluid injection angle on the time-averaged rotor surface temperature. The experience gained from these two-dimensional simulations was then applied to a series of three-dimensional simulations, in which the effects of the film cooling hole distribution on the rotor pressure surface temperature were studied. The results of these simulations indicate that computational procedures can be used to design feasible film cooling schemes which eliminate the adverse effects of combustor hot streaks. Author

A92-48907#

VANE-BLADE INTERACTION IN A TRANSONIC TURBINE. II -HEAT TRANSFER

K. V. RAO, R. A. DELANEY (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN), and M. G. DUNN (Calspan Advanced

Technology Center, Buffalo, NY) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs

(Contract F33615-90-C-2028)

(AIAA PAPER 92-3324)

Part II of this paper presents results of a combined computational/experimental investigation into the effects of stator-rotor interaction on the heat transfer distributions on the vane and blade of a transonic turbine stage. The predictions were obtained using a 2D unsteady Navier-Stokes code described in Part I of this paper and the measurements were acquired in a short-duration shock tunnel facility. Twenty miniature thin-film heat flux button gages were mounted at the mid-span of the vane and blade and contoured inserts containing many thin-film gages were used on the blade leading-edge to spatially resolve the heat transfer rates in that high gradient region. A grid refinement study was performed with steady noninteractive solutions to ascertain the minimum grid size needed to obtain grid undependent solutions. Predicted time averaged and phase-resolved heat transfer rates are compared with measurements on the vane and blade.

Author

National Aeronautics and Space Administration. A92-48923*# Langley Research Center, Hampton, VA.

KRF LASER-INDUCED OH FLUORESCENCE IMAGING IN A SUPERSONIC COMBUSTION TUNNEL

T. M. QUAGLIAROLI, G. LAUFER, S. D. HOLLO, R. H. KRAUSS, R. B. WHITEHURST, III, and J. C. MCDANIEL, JR. (Virginia, University, Charlottesville) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 8 p. refs (Contract NAG1-795)

(AIAA PAPER 92-3346) Copyright

Planar fluorescence images of OH in a continuous-flow, electrical-resistively heated, high enthalpy, hydrogen-air combustion tunnel, induced by a tunable KrF laser, were recorded. These images were compared to previously recorded fluorescence images induced by a doubled-dye laser under similar conditions. Images induced by the doubled-dye laser system demonstrated a severe distortion caused by absorption and fluorescence trapping. By contrast, images of the fluorescence induced by the tunable KrF laser retained the symmetry properties of the flow. Based on signal-to-noise ratio measurements the yield of the fluorescence induced by the doubled-dye laser is larger than the fluorescence yield induced by the KrF laser. The measurements in the present facility of OH fluorescence induced by the KrF laser were limited by the photon-statistical noise. Based 2 on this result, doubled-dye laser systems are recommended for OH imaging in small and OH lean (less than 10 exp 15/cu cm) facilities. KrF lasers should be selected otherwise.

National Aeronautics and Space Administration. A92-48936*# Lewis Research Center, Cleveland, OH.

ADVANCED ROTORCRAFT TRANSMISSION PROGRAM SUMMARY

ROBERT B. BOSSLER, JR. (Lucas Western, Inc., Applied Technology Div., City of Industry, CA) and GREGORY F. HEATH (McDonnell Douglas Helicopter Co., Mesa, AZ) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by U.S. Army. refs

(Contract NAS3-25454)

(AIAA PAPER 92-3363) Copyright

The current status of the Advanced Rotorcraft Transmission (ART) program is reviewed. The discussion includes a general configuration and face gear description, weight analysis, stress analysis, reliability analysis, acoustic analysis, face gear testing, and planned torque split testing. Design descriptions include the face gear webs sized for equal stiffness, a positive engagement clutch, the lubrication system, and a high contact ratio planetary. Test results for five gear materials and three housing materials are presented.

A92-48937*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

BOEING HELICOPTERS ADVANCED ROTORCRAFT TRANSMISSION (ART) PROGRAM SUMMARY OF COMPONENT TESTS

JOSEPH W. LENSKI, JR. (Boeing Defense and Space Group, Helicopters Div., Philadelphia, PA) and MARK J. VALCO (U.S. Army, Propulsion Directorate; NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 28 p. Research supported by U.S. Army.

(Contract NAS3-25421)

(AIAA PAPER 92-3364) Copyright

The principal objectives of the ART program are briefly reviewed, and the results of advanced technology component tests are summarized. The tests discussed include noise reduction by active cancellation, hybrid bidirectional tapered roller bearings, improved bearing life theory and friction tests, transmission lube study with hybrid bearings, and precision near-net-shape forged spur gears. Attention is also given to the study of high profile contact ratio noninvolute tooth form spur gears, parallel axis gear noise study, and surface modified titanium accessory spur gears.

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ADVANCED ROTORCRAFT TRANSMISSION (ART) PROGRAM SUMMARY

T. L. KRANTZ (U.S. Army, Propulsion Directorate; NASA, Lewis Research Center, Cleveland, OH) and J. G. KISH (Sikorsky Aircraft, Stratford, CT) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992, 13 p. Previously announced in STAR as N92-24984. refs (Contract RTOP 505-63-36)

(AIAA PAPER 92-3365) Copyright The Advanced Rotorcraft Transmission (ART) Program was initiated to advance the state of the art for rotorcraft transmissions. The goal of the ART Program was to develop and demonstrate the technologies needed to reduce transmission weight by 25 pct and reduce noise by 10 dB while obtaining a 5000 hr 'mean time between failure'. The research done under the ART Program is summarized. A split path design was selected as best able to meet the program goals. Key part technologies needed for this design were identified, studied, and developed. Two of these technologies are discussed in detail: the load sharing of split path designs including the use of a compliant elastomeric torque splitter and the application of a high ratio, low pitch line velocity gear mesh. Development of an angular contact spherical roller bearing, transmission error analysis, and fretting fatigue testing are discussed. The technologies for a light weight, quiet, and reliable rotorcraft transmission were demonstrated. Author

A92-48939*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ADVANCED ROTORCRAFT TRANSMISSION (ART) -**COMPONENT TEST RESULTS**

Z. S. HENRY (Bell Helicopter Textron, Inc., Fort Worth, TX) AIAA. SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. Research supported by U.S. Army. (Contract NAS3-25455)

(AIAA PAPER 92-3366) Copyright

The preliminary design of the ART and some of the component test results are presented. The goals for the future rotorcraft transmissions include a 25-percent weight reduction in comparison with current state-of-the-art transmissions, a 10-dB reduction in the transmitted noise level, and a system reliability of 5,000 hr mean-time-between-removal for the transmission. The ART tests completed to date support the attainment of the three major goals of the program.

A92-49015#

A NUMERICAL STUDY OF TWO-PHASE FLOW IN GAS **TURBINE COMBUSTORS**

A. K. TOLPADI (GE Research and Development Center, Schenectady, NY) AlAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p.

(AIAA PAPER 92-3468) Copyright

A method is presented for computing steady two-phase turbulent combusting flow in a gas turbine combustor. The gas phase equations are solved in an Eulerian frame of reference. The two-phase calculations are performed by using a liquid droplet spray combustion model and treating the motion of the evaporating fuel droplets in a Lagrangian frame of reference. The numerical algorithm employs nonorthogonal curvilinear coordinates, a multigrid iterative solution procedure, the standard k-epsilon turbulence model, and a combustion model made up of an assumed shape probability density function and the conserved scalar formulation. The trajectory computation of the fuel provides the source terms for all the gas phase equations. Results of the application of the two-phase model to a modern GE/SNECMA single annular CFM56 turbofan engine combustor are reported.

Author

A92-49016# PREDICTION OF GAS TURBINE COMBUSTOR FLOW BY A FINITE ELEMENT CODE

D. LENTINI, C. FELIZIANI, P. IONTA, and F. RISPOLI (Roma I. Universita, Rome, Italy) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by ASI. refs (AIAA PAPER 92-3469) Copyright

A finite element computer code for gas turbine combustor flows, currently under development, is presented which aims at an improved grid flexibility, a reduced numerical diffusion by using the SUPG (Streamline Upwind/Petrov-Galerkin) formulation, and at a detailed representation of the chemistry-turbulence interaction. Both an equilibrium model and a finite-rate model have been developed. The models make it possible to reduce the computer time by a factor of about ten. An application to a 2D flow in a gas turbine combustor, with equilibrium chemistry, is reported to show the workability of the proposed code.

A92-49018#

RESTART OF THEORY OF AIR-BREATHING ENGINES

AUSTIN RESTER AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs

(AIAA PAPER 92-3472) Copyright

Expansion and compression ratios are treated as independent variables in the derivation of new equations for thermal efficiencies. A conceptual process of isentropic compression of exhaust gases to ambient conditions simplifies the equations for piston engines. Expansion is shown to govern thermal efficiency. A variable-process piston engine is introduced in this paper. Relative to 1/2 load conditions, this new engine is 25 percent more efficient than an Otto engine. Relative to full load, the new engine is 35 percent more powerful than a naturally-aspirated Otto engine. New energy-efficient gas turbines and turbo-jets which utilize pulse-combustion to maximize expansion of combustion gases are also introduced. Author

A92-49028#

DESIGN CRITERIA AND ANALYSIS OF THE DYNAMIC BEHAVIOR OF HIGH SPEED, HEAVILY LOADED AND PRECISION EPICYCLIC GEARS FOR AIRCRAFT USE

K. BUYUKATAMAN (Pratt & Whitney Group, East Hartford, CT) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. refs (AIAA PAPER 92-3491) Copyright

An account is given of the design and analysis efforts required for dynamic-properties characterization of single-stage epicyclic gears applicable to aircraft high bypass fans, which require low volume and weight properties. Attention is given to the elastodynamic system simulation conducted, as well as to the mathematical optimization methods applied to the design, taking

into account the effects of design features on the resonating frequencies and their amplitudes. Variations induced by certain design features or manufacturing errors have an influence on dynamic loading, mode shapes, vibration frequencies and amplitudes, and the size of the final design.

ANALYTICAL EVALUATION OF RESONANT RESPONSE OF SPIRAL BEVEL GEARS IN THE RAH-66 HELICOPTER **FANTAIL TRANSMISSION**

R. J. DRAGO and F. W. BROWN (Boeing Defense & Space Group, Philadelphia, PA) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p.

(AIAA PAPER 92-3495) Copyright

Consideration is given to an analytical approach to the dual problems of defining the occurrence of a potentially damaging resonance and modifying the design of a gear to avoid the resonance. Resonant frequencies were determined for the RAH-66 Fantail gears. A dynamic response level was predicted on the basis of frequency response analyses. The method and criteria utilized indicate acceptable performance without incorporation of axillary damping provisions. O.G.

A92-49048#

MANUFACTURING TECHNOLOGY METHODOLOGY FOR PROPULSION SYSTEM PARTS

M. M. MCRAE (Howmet Corp., Whitehall, MI) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. refs (AIAA PAPER 92-3525) Copyright

A development history and a current status evaluation are presented for lost-wax casting of such gas turbine engine components as turbine vanes and blades. The most advanced such systems employ computer-integrated manufacturing methods for high process repeatability, reprogramming versatility, and feedback monitoring. Stereolithography-based plastic model 3D prototyping has also been incorporated for the wax part of the investment casting; it may ultimately be possible to produce the 3D prototype in wax directly, or even to create a ceramic mold directly. Nonintrusive inspections are conducted by X-radiography and neutron radiography.

A92-49064# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

EXPERIMENTS ON THE ENHANCEMENT OF COMPRESSIBLE MIXING VIA STREAMWISE VORTICITY. I - OPTICAL **MEASUREMENTS**

J. W. NAUGHTON and G. S. SETTLES (Pennsylvania State University, University Park) AlAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 15 p. refs

(Contract NAG1-872; NGT-50400)

(AIAA PAPER 92-3549) Copyright

The present study was initiated in an attempt to increase the compressible mixing rate of a supersonic jet injected into a co-flowing supersonic stream by adding streamwise vorticity to the injected flow. This flowfield was imaged using the planar laser scattering technique, and mixing rates were derived entirely from captured images. The results of this image analysis indicate that increases in mixing rate of up to 60 percent are possible through the addition of streamwise vorticity. Furthermore, the degree of mixing enhancement appears to be dependent on the amount of swirl added. Analysis of the instantaneous turbulent structure suggests that this increase in mixing is due to a modification of the largest turbulent structures in the mixing layer. Author

A92-49085#

A NEW VANE SWIRLER AS APPLIED TO DUAL-INLET SIDE-DUMP COMBUSTOR

M. SITU, X. Y. QIU, Q. YU, X. L. CAO, and Q. M. LEE (31st Research Institute, Beijing, People's Republic of China)

SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3654) Copyright

A new vane swirler with insert ring and exit expansion section has been experimentally investigated and applied to side-dump combustor. This swirler behaves a character of supercritical downstream, and produces an embedded recirculation zones in which a larger recirculation zone increases with increasing exit expansion angle. Those vanes are installed in the central extrances of axisymmetrical dump combustor and the side-dump combustor to form a central part swirling flows. Nonreacting velocity flowfields of the vane swirler and pressure drop in a laboratory of the vane swirler and pressure drop in a laboratory scale dual-inlet side-dump combustors have been measured. Results show that the recirculation region is produced and stabilized. Finally, a combustion experiment in a full-scale dual-inlet side-dump combustor has been carried out. The results of the combustion test indicate that the work is stable and the combustion efficiency is adequate.

Author

A92-49087# NUMERICAL STUDY OF SECONDARY SEPARATION IN **GLANCING SHOCK/TURBULENT BOUNDARY LAYER INTERACTIONS**

ARGYRIS G. PANARAS and EGON STANEWSKY (DLR, Institut fuer Experimentelle Stroemungsmechanik, Goettingen, Federal AIAA, SAE, ASME, and ASEE, Joint Republic of Germany) Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 11 p. refs

(AIAA PAPER 92-3666) Copyright

Experimentally it has been found that in moderate strength glancing shock/turbulent boundary layer interactions, as they occur, e.g., in supersonic and hypersonic intakes, a secondary separation line appears in the surface flow pattern. In the present paper, a flow of this type, studied at the Pennsylvania State University, is simulated numerically. It is shown that if the turbulence model of Baldwin and Lomax is applied according to the physics of the flow, the resulting solution agrees very well with the experimental evidence (wall pressure, skin friction, flow angle). Then, post-processing of the solution reveals that in this type of interaction the secondary separation phenomenon is similar to that observed in flows around bodies at high incidence. Furthermore, it has been found that the secondary separation adversely affects the conical nature of the flow. The dynamic characteristics of the conical vortex which are known to appear in these types of flow change in such a way that the various flow parameters exhibit a variation along conical rays in the region of the conical vortex, instead of remaining constant, a requirement for a purely conical flow.

Author

A92-49096# **DEVELOPMENT OF HIGH PERFORMANCE COMPRESSOR DISCHARGE SEAL**

JOHN H. MUNSON (General Motors Corp., Allison Gas Turbine Div., Indianapolis, IN) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 10 p. Research supported by U.S. Navy. refs

(AIAA PAPER 92-3714) Copyright
A gas lubricated film riding seal (FRFS) that is being developed for use in an advanced subsonic demonstrator engine is investigated. Results obtained indicate that, for gas turbine application, hydrodynamic FRFSs appear to be preferred to hydrostatic designs. A spiral groove design was the overall best seal, followed by a Rayleigh pad seal. Particular attention is given to the problem of integrating the seals into an engine in such a manner that distortion of the sealing faces is minimized. It is found that this can be accomplished in a straightforward manner. O.G.

National Aeronautics and Space Administration. A92-49126*# Lewis Research Center, Cleveland, OH.

A COMPUTATIONAL STUDY OF ADVANCED EXHAUST SYSTEM TRANSITION DUCTS WITH EXPERIMENTAL **VALIDATION**

C. WU, S. FAROKHI, and R. TAGHAVI (Kansas, University, AIAA, SAE, ASME, and ASEE, Joint Propulsion Lawrence) Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by GE Aircraft Engines. refs (Contract NAG3-841)

(AIAA PAPER 92-3794) Copyright

The current study is an application of CFD to a 'real' design and analysis environment. A subsonic, three-dimensional parabolized Navier-Stokes (PNS) code is used to construct stall margin design charts for optimum-length advanced exhaust systems' circular-to-rectangular transition ducts. Computer code validation has been conducted to examine the capability of wall static pressure predictions. The comparison of measured and computed wall static pressures indicates a reasonable accuracy of the PNS computer code results. Computations have also been conducted on 15 transition ducts, three area ratios, and five aspect ratios. The three area ratios investigated are constant area ratio of unity, moderate contracting area ratio of 0.8, and highly contracting area ratio of 0.5. The degree of mean flow acceleration is identified as a dominant parameter in establishing the minimum duct length requirement. The effect of increasing aspect ratio in the minimum length transition duct is to increase the length requirement, as well as to increase the mass-averaged total pressure losses. The design guidelines constructed from this investigation may aid in the design and manufacture of advanced exhaust systems for modern fighter aircraft. Author

N92-28253# Naval Training Systems Center, Orlando, FL. AN ANALYSIS OF AIRCREW COMMUNICATION PATTERNS AND CONTENT Final Report, Aug. 1989 - Apr. 1990 RANDALL L. OSER, CAROLYN PRINCE, BEN B. MORGAN, JR., and STEVEN S. SIMPSON 3 Sep. 1991 80 p (Contract NR PROJ. RM3-3-T-21)

(AD-A246618; NTSC-TR-90-09) Avail: CASI HC A05/MF A01 The findings reported here represent a detailed analysis of tactical rotary-wing aircrew communication patterns and content. This research is part of an extensive effort to investigate the nature of tactical aircrew coordination and to develop effective mission-oriented aircrew coordination training. The primary objectives of this research were to answer the following questions: (1) What specific communication patterns and content are demonstrated by different helicopter crewmembers (i.e., Helicopter Aircraft Commander - HAC and Helicopter 2nd Pilot - H2P)? (2) Do tactical aircrew communication patterns and content vary as a function of the performance demands and requirements of different flight conditions (i.e., routine and non-routine)? (3) Are the communication patterns and content of more effective aircrews different from those of less effective aircrews? (4) What similarities exist between the communication patterns and content of military rotary-wing aircrews and commercial fixed-wing aircrews? and (5) Can the results of the communication analyses have an impact on aircrew coordination training?

N92-28361*# Old Dominion Univ., Norfolk, VA. Dept. of Mechanical Engineering and Mechanics. VISCOUS EFFECTS ON A VORTEX WAKE IN GROUND

EFFECT Final Report, period ending 31 May 1991 Z. ZHENG and ROBERT L. ASH Jun. 1992 48 p

(Contract NAG1-987)

(NASA-CR-190400; NAS 1.26:190400) Avail: CASI HC A03/MF A01

Wake vortex trajectories and strengths are altered radically by interactions with the ground plane. Prediction of vortex strength and location is especially important in the vicinity of airports. Simple potential flow methods have been found to yield reasonable estimates of vortex descent rates in an otherwise quiescent ambient background, but those techniques cannot be adjusted for more realistic ambient conditions and they fail to provide satisfactory estimates of ground-coupled behavior. The authors have been involved in a systematic study concerned with including viscous effects in a wake-vortex system which is near the ground plane. The study has employed numerical solutions to the Navier-Stokes equations, as well as perturbation techniques to study ground coupling with a descending vortex pair. Results of a two-dimensional, unsteady numerical-theoretical study are presented in this paper. A time-based perturbation procedure has been developed which permits the use of analytical solutions to an inner and outer flow domain for the initial flow field. Predictions have been compared with previously reported laminar experimental results. In addition, the influence of stratification and turbulence on vortex behavior near the ground plane has been studied.

Author

N92-28425# Army Lab. Command, Watertown, MA. Material Technology Lab.

A SENSITIVITY ANALYSIS ON COMPONENT RELIABILITY FROM FATIGUE LIFE COMPUTATIONS Final Report DONALD M. NEAL, WILLIAM T. MATTHEWS, MARK G. VANGEL, and TREVOR RUDALEVIGE Feb. 1992 23 p (AD-A247430; MTL-TR-92-5) Avail: CASI HC A03/MF A01

Some uncertainties in determining high component reliability at a specified lifetime from a case study involving the fatigue life of a helicopter component are identified. Reliabilities are computed from results of a simulation process involving an assumed variability (standard deviation) of the load and strength in determining fatigue life. The uncertainties in the high reliability computation are then examined by introducing small changes in the variability for the given load and strength values in the study. Results showed that for a given component lifetime, a small increase in variability of load or strength produced large differences in the component reliability estimates. Among the factors involved in computing fatigue lifetimes, the component reliability estimates were found to be most sensitive to variability in loading. Component fatigue life probability density functions were obtained from the simulation process for various levels of variability. The range of life estimates were very large for relatively small variability in load and strength.

N92-28434*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

APPLICATION OF FACE-GEAR DRIVES IN HELICOPTER TRANSMISSIONS

F. L. LITVIN (Illinois Univ., Chicago.), J.-C. WANG (Illinois Univ., Chicago.), R. B. BOSSLER, JR. (Lucas Western, Inc., City of Industry, CA.), Y.-J. D. CHEN (McDonnell-Douglas Helicopter Co., Mesa, AZ.), G. HEATH (McDonnell-Douglas Helicopter Co., Mesa, AZ.), and D. G. LEWICKI 1992 10 p Proposed for presentation at the Sixth International Power Transmission and Gearing Conference, Scottsdale, AZ, 13-16 Sep. 1992; sponsored by ASME

(Contract RTOP 505-63-36; DA PROJ. 1L1-62211-A-47-A) (NASA-TM-105655; E-7019; NAS 1.15:105655; AVSCOM-TR-91-C-036) Avail: CASI HC A02/MF A01

The use of face gears in helicopter transmissions was explored. A light-weight, split torque transmission design utilizing face gears was described. Face-gear design and geometry were investigated. Topics included tooth generation, limiting inner and outer radii, tooth contact analysis, contact ratio, gear eccentricity, and structural stiffness. Design charts were developed to determine minimum and maximum face-gear inner and outer radii. Analytical study of transmission error showed face-gear drives were relatively insensitive to gear misalignment, but tooth contact was affected by misalignment. A method of localizing bearing contact to compensate for misalignment was explored. The proper choice of shaft support stiffness enabled good load sharing in the split torque transmission design. Face-gear experimental studies were also included and the feasibility of face gears in high-speed, high-load applications such as helicopter transmissions was demonstrated.

Author

N92-28694# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

TURBULENCE MODELING: SURVEY OF ACTIVITIES IN BELGIUM AND THE NETHERLANDS, AND APPRAISAL OF THE STATUS AND A VIEW ON THE PROSPECTS

B. VANDERBERG 28 May 1990 12 p Presented at AGARD

Fluid Dynamics Panel Technical Status Review on Appraisal of the Suitability of Turbulence Models in Flow Calculations, Friedrichshafen, Fed. Republic of Germany, 26 Apr. 1990 (NLR-TP-90184-U: ETN-92-91540) Avail: CASI HC A03/MF A01

Some experimental results obtained in turbulent boundary layers, as occur on airplane wings, are considered in relation to the usual turbulence mode assumptions. The status of turbulence modeling is found not to be satisfactory. To support the development of semiempirical models of acceptable accuracy, a more extensive base of reliable turbulence data is desirable.

=SA

N92-28712# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics/Informatics Div.

BOUNDARY CONDITIONS FOR EULER EQUATIONS AT INTERNAL BLOCK FACES OF MULTI-BLOCK DOMAINS USING LOCAL GRID REFINEMENT

A. KASSIES (Aeritalia S.p.A., Naples (Italy).) and R. TOGNACCINI (Aeritalia S.p.A., Naples, Italy) 10 Apr. 1990 19 p Presented at the AlAA 21st Fluid Dynamics, Plasma Dynamics and Lasers Conference, Seattle, WA, 18-20 Jun. 1990 Previously announced in IAA as A90-38725 Prepared in cooperation with Aeritalia S.p.A., Naples, Italy

(Contract NIVR-01604-N)

(NLR-TP-90134-U; ETN-92-91533) Avail: CASI HC A03/MF A01

A method for the numerical treatment of boundary conditions for Euler equations at internal block faces of arbitrary complex three dimensional patched multiblock domains is developed. The method should allow cell length and skewness discontinuities of the grid normal to the internal faces, and local grid refinement in each block individually. The method is developed for multiblock flow solvers based on an explicit cell centered finite volume scheme with adaptive numerical dissipation. The discontinuities of the grid at internal block faces are treated by a boundary condition using the gradient vector of each flow variable to determine the flow state at the internal face. In case of local grid refinement, where a coarse grid cell may be connected to any number of fine grid cells, a unique value of the gradient vector is used for all fine grid cells connected to a coarse grid cell. The resulting scheme is fully conservative and may be easily extended to other types of flow solvers. By implementing the described method in a three dimensional multiblock solver, a powerful aerodynamic analysis tool for solving the Euler equations in an arbitrary flow domain is obtained. The ability of the flow solver to handle grid discontinuities over internal faces allows much freedom in the grid generation process. The use of local grid refinement per block offers the desired flow simulation accuracy with grids of reasonable size.

ESA

N92-28788# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction de lAerodynamique. CONSTRUCTION OF A NUMERICAL OPTIMIZATION METHOD FOR THE DEFINITION OF HYPERSUPPORTED PROFILES Final Summary Report [REALISATION DUNE METHODE DOPTIMISATION NUMERIQUE POUR LA DEFINITION DE PROFILES HYPERSUSTENTES. RAPPORT DE SYNTHESE FINAL]

F. MOENS Jun. 1991 66 p In FRENCH (Contract DRET-89-34-001) (ONERA-RSF-43/1736-AY-146A; ETN-92-91326) Avail: CASI HC A04/MF A01

The method for a two dimensional description of hyper-supported profiles by numerical optimization consists of a stress minimization program, named CONMIN, and the aerodynamic program, named VIS18. The viscous effects are taken into account by the strong coupling iterative method. The decision variables considered are the deflection values, slots and flap covers, and the incidence of the assembly. The aim of the study is to maximize the whole lift-slope coefficient, for given values of stresses of the overspeeds of different bodies. The importance of including the viscous effects was demonstrated for the optimization of the OALT25 laminar profile, with a two slit flap. The deflection values calculated are greater than those obtained by optimization in an

inviscid fluid, and a separation on the second flap is observed. Problems concerning relative minimal values and of multiple solutions were found for the optimization of the OAULM02 profile, with a single slot flap. These effects can be reduced by increasing the coupling interactions, although the calculation time increases.

N92-28814# Oak Ridge National Lab., TN. ASSESSMENT OF VALVE ACTUATOR MOTOR ROTOR **DEGRADATION BY FOURIER ANALYSIS OF CURRENT WAVEFORM**

J. D. KUECK (Carolina Power and Light Co., Raleigh, NC.), J. C. CRISCOE (Carolina Power and Light Co., Raleigh, NC.), and N. Presented at the 54th Annual M. BURSTEIN 1992 15 p American Power Conference, Chicago, IL, 13-15 Apr. 1992 (Contract DE-AC05-84OR-21400) (DE92-013233; CONF-920432-11) Avail: CASI HC A03/MF A01

This paper presents a test report of a motor diagnostic system which uses Fourier Analysis of the motor current waveform to detect broken rotor bars in the motor or defects in the driven equipment. The test was conducted on a valve actuator motor driving a valve actuator which was in turn driving a dynamometer to measure the actuator torque output. The motor was gradually degraded by open circuiting rotor bars. The test confirmed the efficacy of the waveform analysis method for assessing motor rotor degradation and also provided data regarding the change in waveform characteristics as motor rotors are gradually degraded to failure.

N92-28836# National Aerospace Lab., Tokyo (Japan). Space Technology Research Group.

QUATERNION AND EULER ANGLES IN KINEMATICS ISAO YAMAGUCHI, TAKASHI KIDA, OSAMU OKAMOTO, and YOSHIAKI OOKAMI Jun. 1991 18 p In JAPANESE (ISSN 0452-2982)

(NAL-TM-636; JTN-92-80363) Avail: CASI HC A03/MF A01 A summary of quaternion in the kinematics of rigid body dynamics is presented. Quaternion is a four parameter system for specifying the orientation of a rigid body. Four parameters of quaternion are updated by integrating linear differential equations whose coefficients are the angular velocity of the body. After describing the coordinate systems and vectors, quaternion is introduced. Then, using a comparison with the Euler angles, typical presentation of body orientation and the relationships between quaternion and angular velocity are discussed. Finally, a computer simulation algorithm is derived to solve rigid body dynamics using quaternion. Author (NASDA)

N92-28879# Pennsylvania State Univ., University Park. Turbomachinery Lab.

EXPLICIT NAVIER-STOKES COMPUTATION OF TURBOMACHINERY FLOWS Final Report, 1 Aug. 1986 - 31 Dec. 1991

ROBERT KUNZ and B. LAKSHMINARAYANA Jan. 1992 251 p

(Contract DAAL03-86-G-0044)

(AD-A249284; PSU-TURBO-R-9201) Avail: CASI HC A12/MF

A new three-dimensional explicit Navier-Stokes procedure has been developed for computation of turbomachinery flows. Several numerical strategies and modelling techniques have been developed and incorporated which enable convergent and accurate predictions of high Reynolds number flowfields across a wide range of Mach numbers. These include incorporation of a compressible low Reynolds number form of the turbulence transport model and other physical and solution parameters, eigenvalue and local velocity artificial dissipation scalings, a compact flux evaluation procedure, and a hybrid low Reynolds number ke/algebraic Reynolds stress model. Detailed stability and order of magnitude analyses are performed on the discrete system of seven governing equations. Conclusions are drawn concerning the influence of system rotation and turbulence transport source terms, implicit source term treatment and the coupling of the discrete mean flow

equation system to the turbulence model equations and its effect on the stability of the numerical scheme. Three-dimensional validation is provided by the results of an incompressible curved duct flow computation. A high Reynolds number axial rotor flow, for which extensive experimental data is also available, was computed. A backswept transonic centrifugal compressor flow, for which L2F meridional passage velocity measurements are available, is computed. Full Navier-Stokes solutions are presented which are shown to capture detailed viscous dominated flow features.

GRA

N92-29099* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD. SUPERCONDUCTING BEARINGS WITH LEVITATION

CONTROL CONFIGURATIONS Patent YURY FLOM, inventor (to NASA) and JAMES D. ROYSTON, inventor (to NASA) 26 May 1992 13 p Filed 17 Apr. 1991 Supersedes N91-28578 (29 - 20, p 3354) (NASA-CASE-GSC-13346-1; US-PATENT-5,117,139;

US-PATENT-APPL-SN-691609; US-PATENT-CLASS-310-90.5; US-PATENT-CLASS-505-876; INT-PATENT-CLASS-H02K-1/14; INT-PATENT-CLASS-F16C-32/04) Avail: US Patent and Trademark Office

An improved superconducting bearing is presented. Rotor is confined within two superconducting circular bearing structures. each of which has a number of embedded heating elements, and will levitate rotor which has embedded magnets in its end. Heating elements are connected to a feedback control unit, as are rotor position sensors. The temperature profiles of each circular bearing structure is then adjusted according to the information on rotor position provided to control unit by position sensors. Novelty is believed to reside in providing a superconducting circular bearing structure allowing for a control of the levitating forces.

Official Gazette of the U.S. Patent and Trademark Office

N92-29105*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

A 4-SPOT TIME-OF-FLIGHT ANEMOMETER FOR SMALL CENTRIFUGAL COMPRESSOR VELOCITY MEASUREMENTS MARK P. WERNET and GARY J. SKOCH Jul. 1992

Presented at the Sixth International Symposium on the Application of Laser Techniques to Fluid Mechanics, Lisbon, Portugal, 20-23 Jul. 1992; sponsored by the Instituto Superio Techico (Contract DA PROJ. 1L1-62211-A-47-A; RTOP 505-62-50) (NASA-TM-105717; E-7112; NAS 1.15:105717;

AVSCOM-TR-92-C-026) Avail: CASI HC A02/MF A01

The application of laser anemometry techniques turbomachinery facilities is a challenging dilemma requiring an anemometer system with special qualities. Here, we describe the use of a novel laser anemometry technique applied to a small 4.5 kg/s, 4:1 pressure ratio centrifugal compressor. Sample velocity profiles across the blade pitch are presented for a single location along the rotor. The results of the intra-blade passage velocity measurements will ultimately be used to verify CFD 3-D viscous code predictions. Author

N92-29118# Oxford Univ. (England).
TURBULENT SPOT GENERATION AND GROWTH RATES IN A TRANSONIC BOUNDARY LAYER Final Report, 15 May 1989 -14 Oct. 1991

J. P. CLARK, J. E. LEGRAFF, and T. V. JONES 18 Mar. 1992

(Contract AF-AFOSR-0427-89)

(AD-A250221; AFOSR-92-0365TR) Avail: CASI HC A03/MF A01 Wide-bandwidth surface heat transfer instrumentation has been used to track the generation, convection and growth of turbulent spots in a laminar boundary layer undergoing transition to turbulence. The model was a flat plate subjected to a range of free stream conditions in a piston-driven isentropic compression heated transient wind tunnel at Oxford University. Freestream Mach number (subsonic to 2.0), freestream turbulence and streamwise pressure gradient (favorable to adverse) were varied. Preliminary analysis of the time-resolved heat transfer data allowed estimates of spot convection rates, generation rates and spreading angles to be estimated. Convection rates were little affected by Mach number, whereas spreading angles were narrowed by favorable pressure gradients and expanded by adverse gradients. GRA

N92-29136*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

DYNAMICS OF A SPLIT TORQUE HELICOPTER TRANSMISSION

MAJID RASHIDI (Cleveland State Univ., OH.) and TIMOTHY KRANTZ (Army Aviation Systems Command, Cleveland, OH.) 1992 14 p Prepared for presentation of the 6th International Power Transmission and Gearing Conference, Scottsdale, AZ, 13-16 Sep. 1992; sponsored in part by ASME

(Contract DA PROJ. 1L1-62211-A-47-Á; RTOP 505-63-36) (NASA-TM-105681; E-7060; AVSCOM-TR-91-C-043; NAS 1.15:105681) Avail: CASI HC A03/MF A01

A high reduction ratio split torque gear train has been proposed as an alternative to a planetary configuration for the final stage of a helicopter transmission. A split torque design allows a high ratio of power-to-weight for the transmission. The design studied in this work includes a pivoting beam that acts to balance thrust loads produced by the helical gear meshes in each of two parallel power paths. When the thrust loads are balanced, the torque is split evenly. A mathematical model was developed to study the dynamics of the system. The effects of time varying gear mesh stiffness, static transmission errors, and flexible bearing supports are included in the model. The model was demonstrated with a test case. Results show that although the gearbox has a symmetric configuration, the simulated dynamic behavior of the first and second compound gears are not the same. Also, results show that shaft location and mesh stiffness tuning are significant design parameters that influence the motions of the system.

N92-29191# Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.

MODULAR SIMULATION OF HEI FRAGMENTS AND BLAST PRESSURE M.S. Thesis

GORDON L. GALLOWAY Mar. 1992 257 p (AD-A248205; AFIT/GOR/ENS/92M-11) Avail: CASI HC A12/MF A03

The fragmentation and blast pressure of High Explosive Incendiary projectiles are major causes of aircraft fuel fires. Because Halon 1301 is being banned from DoD use as a fire suppressant, alternative fire suppressants must be developed and tested. These new suppressants must counteract the fire directly or eliminate one or more of the factors which cause the fire. To this end, this thesis takes a detailed look at the HEI processes that lead to a fire. A comprehensive review of the current knowledge and understanding of these processes is presented. In addition, hypothesized dependencies between the various processes are stated. These hypothesized dependencies can not be proved or disproved with data at this time. Therefore, tests and test set-ups are outlined to collect the necessary data. The evidence in support of these dependencies is also presented. To aid the testing of various fire suppressant system and the hypothesized HEI explosion dependencies a simulation of the HEI explosion was developed. This simulation allows the user to simulate any configuration of the aircraft dry bay, and any attack scenario for the projectile. Using this simulation one of the hypothesized dependencies was tested and shown to be possible.

N92-29344# Naval Postgraduate School, Monterey, CA. IMPROVING THE LAMP MK 3 SH-60B HF COMMUNICATION SYSTEM M.S. Thesis

FREDERICK C. ADAMS, JR. Sep. 1991 64 p (AD-A245970) Avail: CASI HC A04/MF A01

This thesis examines the over-the-horizon (OTH) communications capability of the SH-60B Seahawk. The LAMPS Mk III communications system incorporated a high frequency (HF) radio in its design to provide reliable two-way voice communications at extended ranges for use during operations that require the helicopter to be below the ship's radio horizons. In addition, the

HF radio system is necessary to provide communications with non-LAMPS equipped naval forces and commercial shipping and to provide long-range, sea-air rescue capabilities. Topics addressed with respect to the OTH communications capability of the SH-60B Seahawk are the basis of HF propagation theory, a chronology of events concerning the SH-60B's current HF communication system and an analysis of issues.

Author (GRA)

N92-29603# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

SHORT CRACKS AND DURABILITY ANALYSIS OF THE FOKKER 100 WING/FUSELAGE STRUCTURE

R. J. H. WANHILL and L. SCHRA 2 Oct. 1990 24 p Presented at the International Conference on Short Cracks, Sheffield, England, Dec. 1990

(NLR-TP-90336-U; ETN-92-91449) Avail: CASI HC A03/MF A01 Short and long fatigue crack growth in the industry standard damage tolerant aluminum alloy 2024-T3 were compared using flight simulation loading representative for the Fokker 100 wing/fuselage structure. The results and a straightforward durability analysis showed that the behavior of short cracks is not significant for the current wing/fuselage structure. The data provide a reference for evaluating new candidate materials for durable wing/fuselage structures in transport aircraft.

N92-29683# Manchester Univ. (England). Aeroanutical Engineering Group.

AERONAUTICAL ENGINEERING GROUP PUBLICATIONS, 1950 - PRESENT

1989 19 p

(AERO-REPT-8907; ETN-92-91342) Avail: CASI HC A03/MF A01

A list of 232 publications of the aeronautical engineering group is presented. For each entry the author(s), source and date of publication, and article title, are presented.

N92-29830*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

AERODYNAMIC DESIGN OPTIMIZATION USING SENSITIVITY ANALYSIS AND COMPUTATIONAL FLUID DYNAMICS Patent Application

OKTAY BAYSAL, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) and MOHAMAD E. ELESHAKY, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 3 Jan. 1992 24 p (Contract NAG1-1188)

(NASA-CASE-LAR-14815-1-CU; NAS 1.71:LAR-14815-1-CU; US-PATENT-APPL-SN-820432) Avail: CASI HC A03/MF A01

An efficient aerodynamic shape optimization method based on a computational fluid dynamics/sensitivity analysis algorithm has been developed which determines automatically the geometrical definition of an optimal surface starting from any initial arbitrary geometry. This method is not limited to any number of design variables or to any class of surfaces for shape definition. NASA

N92-29873# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Helicopter Component Test.

COMPUTED TOMOGRAPHY (CT) AS A NONDESTRUCTIVE TEST METHOD USED FOR COMPOSITE HELICOPTER COMPONENTS

REINHOLD OSTER 1991 9 p Presented at the 17th European Rotorcraft Forum, Berlin, Fed. Republic of Germany, 24-27 Sep. 1991

(MBB-UD-0603-91-PUB; ETN-92-91695) Avail: CASI HC A02/MF A01

The first components of primary helicopter structures to be made of glass fiber reinforced plastics were the main and tail rotor blades of the Bo105 and BK117 helicopters. These blades are now successfully produced in series. New developments in rotor components, e.g. the rotor blade technology of the Bo108 and PAH2 programs, make use of very complex fiber reinforced structures to achieve simplicity and strength. Computer tomography was found to be an outstanding nondestructive test method for examining the internal structure of components. A CT scanner

generates x-ray attenuation measurements which are used to produce computer reconstructed images of any desired part of an object. The system images a range of flaws in composites in a number of views and planes. Several CT investigations and their results are reported taking composite helicopter components as an example.

N92-29877# Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Abt. Hochfrequenzphysik.

GLOBAL AND HIGH RESOLUTION RADAR CROSS SECTION MEASUREMENTS AND TWO-DIMENSIONAL MICROWAVE IMAGES OF A SCALED AIRCRAFT MODEL FROM THE TYPE AIRBUS A 310 [GLOBALE UND HOCHAUFGELOESTE RADARRUECKSTRAHLQUERSCHNITTS-MESSUNGEN UND ZWEIDIMENSIONALE MIKROWELLENABBILDUNGEN VON EINEM SKALIERTEN UND FLUGZEUGMODELL VOM TYP AIRBUSS A 310]

KARL-HEINZ BETHKE Jun. 1991 54 p In GEORGIAN (ISSN 0939-298X)

(DLR-MITT-91-10; ETN-92-91731) Avail: CASI HC A04/MF A01; DLR, Wissenschaftlisches Berichtswesen, Postfach 90 60 58, 5000 Cologne, Fed. Republic of Germany, HC

The results from radar cross section high resolution measurements of a metallized scaled model of a usual airliner of the Airbus A310 type are presented. The measurements were performed for line polarization states by using a coherent short pulse radar at a frequency of 12.5 GHz. Two dimensional microwave images were generated for varied aspect angles by using inverse synthetic aperture principles to obtain an exact identification of each scattering center of the model. Polarization dependent back diffusions are particularly visible at the wing edges in the respective reflection images. The fins of airfoils are visible by vertical polarization for aspect angles from side views.

N92-29933# Pennsylvania State Univ., University Park. Turbomachinery Lab.

EXPLICIT NAVIER-STOKES COMPUTATION OF TURBOMACHINERY FLOWS Final Report, 1 Aug. 1986 - 31 Dec. 1991

ROBERT F. KUNZ and BUDUGUR LAKSHMINARAYANA Jan. 1992 23 p

(Contract DAAL03-86-G-0044)

(AD-A248458; PSU-TURBO-9201) Avail: CASI HC A03/MF A01 A new three-dimensional explicit Navier-Stokes procedure was

developed for computation of turbulent turbomachinery flows. Several numerical strategies and modelling techniques were developed and incorporated which enable convergent and accurate predictions of high Reynolds number flow fields across a wide range of Mach numbers. These include incorporation of a compressible low Reynolds number form of the k-e turbulence model in a fully explicit fashion, appropriate stability bound treatment of the transport turbulence model and other physical and solution parameters, eigenvalue and local velocity artificial dissipation scalings, a compact flux evaluation procedure and a hybrid low Reynolds number kappa-sigma/algebraic Reynolds stress model. This report provides a summary of this research. In what follows, primary research findings are summarized (details provided in cited references by the present authors), and several sample turbomachinery application results are provided. Specifically, two-dimensional results are provided for a supersonic compressor cascade operating at unique incidence condition. Three-dimensional validation is provided by a high Reynolds number axial rotor flow, for which extensive experimental data is available. This large scale computation is shown to capture rotational inviscid, blade and endwall boundary layer and wake flow physics, including spanwise mixing effects, with good accuracy. Finally, a backswept transonic centrifugal compressor flow, for which L2F meridional passage velocity measurements are available, are computed.

GRA

N92-29954*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ACTIVE THERMAL ISOLATION FOR TEMPERATURE RESPONSIVE SENSORS Patent Application

SCOTT D. MARTINSON, inventor (to NASA), DAVID L. GRAY, inventor (to NASA), DEBRA L. CARRAWAY, inventor (to NASA), and DANIEL C. REDA, inventor (to NASA) 2 Jan. 1992 16 p (NASA-CASE-LAR-14612-1; NAS 1.71:LAR-14612-1; US-PATENT-APPL-SN-820431) Avail: CASI HC A03/MF A01

The detection of flow transition between laminar and turbulent flow and of shear stress or skin friction of airfoils is important in basic research for validation of airfoil theory and design. These values are conventionally measured using hot film nickel sensors deposited on a polyimide substrate. The substrate electrically insulates the sensor and underlying airfoil but is prevented from thermally isolating the sensor by thickness constraints necessary to avoid flow contamination. Proposed heating of the model surface is difficult to control, requires significant energy expenditures, and may alter the basic flow state of the airfoil. A temperature responsive sensor is located in the airflow over the specified surface of a body and is maintained at a constant temperature. An active thermal isolator is located between this temperature responsive sensor and the specific surface of the body. The total thickness of the isolator and sensor avoid any contamination of the flow. The temperature of this isolator is controlled to reduce conductive heat flow from the temperature responsive sensor to the body. This temperature control includes (1) operating the isolator at the same temperature as the constant temperature of the sensor; and (2) establishing a fixed boundary temperature which is either (a) less than or equal to or (b) slightly greater than the sensor constant temperature. The present invention accordingly thermally isolates a temperature responsive sensor in an energy efficient, controllable manner while avoiding any contamination of

N92-30028*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

COMBÍNED LOAD TEST APPARATUS FOR FLAT PANELS Patent Application

ROBERT R. MCWITHEY, inventor (to NASA) (AS&M, Inc., Hampton, VA.), CARL J. MARTIN, JR., inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.), and JEFFREY A. CERRO, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.) 7 Apr. 1992 16 p (NASA-CASE-LAR-14698-1; NAS 1.71:LAR-14698-1;

US-PATENT-APPL-SN-866769) Avail: CASI HC A03/MF A01 Future hypersonic aircraft such as the National Aero-Space Plane and a high speed civil transport will require the design and use of efficient, highly-loaded, flat structural panels to achieve mission requirements. These panels will be subjected to severe combinations of in-plane mechanical distributed loads (i.e., normal loads in two perpendicular directions plus a shear load), in addition to pressure and thermal loads. A testing apparatus is provided for applying uniform combined in-plane stresses to a flat panel containing an interior test area. Actuators cause two sets of load rods to apply loads to the edge of the flat panel. The first set applies loads which are perpendicular to and independent of the loads applied by the second set. The loads are applied according to a cosine load distribution to obtain a uniform stress field within the test area. The flat panel may be rotated with respect to the applied loads to obtain a wide range of combined stresses in the test area. Movement outside the plane of the flat panel may be selectively prevented by connecting the flat panel to a restraining disk by support rods. The support rods then define the test area. A thermal load may be applied to one side of the flat panel and a pressure load may be applied to the other side. The novelty of this method is found in providing a testing apparatus which allows mechanical, thermal and pressure loads to be applied simultaneously to a flat panel for testing purposes. NASA

N92-30042*# Stanford Univ., CA. Center for Turbulence Research.

A PRELIMINARY EXPERIMENTAL INVESTIGATION OF LOCAL ISOTROPY IN HIGH-REYNOLDS-NUMBER TURBULENCE

SRINIVAS V. VEERAVALLI and SEYED G. SADDOUGHI In its Annual Research Briefs, 1991 p 3-20 Avail: CASI HC A03/MF A04 Dec. 1991

Detailed measurements of the velocity field were made in the wall boundary layer of the 80 by 120 foot facility at NASA Ames. The Reynolds Number R(sub lambda), based on the Taylor microscale lambda at the measurement location, was approximately 1450, one of the largest attained in laboratory flows. The data indicate that to within measurement accuracy, the w-spectrum follows, but the v-spectrum deviates from, the isotropic relation in the inertial subrange. No definite statement can be made regarding local isotropy for the dissipating scales because the spectral measurements were contaminated by high-frequency electrical noise, but it appears that the inertial-subrange anisotropy persists Author in the dissipation region.

N92-30044*# Stanford Univ., CA. Center for Turbulence Research.

NON-LINEAR INTERACTIONS IN HOMOGENEOUS TURBULENCE WITH AND WITHOUT BACKGROUND ROTATION

FABIAN WALEFFE In its Annual Research Briefs, 1991 p 31-43 Dec. 1991

Avail: CASI HC A03/MF A04

Domaradzki et al. concluded (1988, 1990 a,b) that turbulent transfers are dominated by non-local interactions with local energy transfer. This is only partly consistent with the common wisdom that local interactions with local energy transfer dominate the inertial cascade. Brasseur et al. (1991 a,b,c) then called on this predominance of non-local interactions to refute the Kolmogorov assumption of local isotropy at the small scales. The inertial wave decomposition showed features observed in the simulations. A deeper analysis was undertaken in search of a better understanding of triad interactions and of the significance of the numerical results. The helical (or inertial wave) decomposition of the velocity field clearly identified two types of triadic transfers depending on whether the small scale helical modes have helicities of the same or the opposite sign. Only one type of interaction shows local transfer when the triads are non-local. In those cases, the local cascade to higher wavenumber must always be accompanied by a feedback on the large scale. An instability principle, suggested by the stability characteristics of triad interactions, has been introduced and predicts the direction of the energy transfers. These predictions agree with DNS and the Test Field Model.

N92-30064*# Stanford Univ., CA. Center for Turbulence Research.

METHODS FOR DIRECT SIMULATION OF TRANSITION IN **HYPERSONIC BOUNDARY LAYERS 2**

J. J. W. VANDERVEGT In its Annual Research Briefs, 1991 p 299-307 Dec. 1991

Avail: CASI HC A02/MF A04

The prediction of transition to turbulence in compressible boundary layers currently receives significant attention due to its importance in the design of high speed transport vehicles. Drag, lift, and heat transfer strongly depend on whether the boundary layer is laminar or turbulent. The study of transition in compressible boundary layers by means of direct numerical simulation (DNS) provides information not available from the commonly used linear and nonlinear stability theories. We want to study flows with both strong shocks and boundary layers, but, unfortunately, most shock capturing schemes are very dissipative in the boundary layer. We have previously presented a fully implicit finite volume method, and significant progress was made in improving the efficiency of a fully implicit method without using the approximate factorization method of Beam and Warming (1978). The finite volume method, however, is only second order accurate, and it was felt that higher order accuracy is necessary in order for success in direct numerical simulation of transition. The construction of an implicit and time accurate fourth order scheme is discussed.

N92-30065*# Stanford Univ., CA. Center for Turbulence Research.

EFFECT OF WALLS ON THE SUPERSONIC REACTING **MIXING LAYER**

D. S. SHIN and J. H. FERZIGER In its Annual Research Briefs, 1991 p 309-330 Dec. 1991 Avail: CASI HC A03/MF A04

Most stability analyses of supersonic mixing layers have considered unconfined shear layers. However, the supersonic mixing layers in ramjet combustors and most experiments are confined by solid walls. To include the effect of chemical reactions, the authors consider a reacting mixing layer in a channel. The chemistry model is a finite rate single step irreversible reaction with Arrhenius kinetics. All flow variables are nondimensionalized by their fast-stream values. The effects of heat release, Mach number, frequency, wavenumber, thickness of shear layer, as well as distance between walls and direction of wave propagation are considered.

N92-30082*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX. **BEARING SERVICING TOOL Patent Application**

REX A. BOYCE, inventor (to NASA) 31 Oct. 1991 18 p (NASA-CASE-MSC-21881-1; NAS 1.71:MSC-21881-1; US-PATENT-APPL-SN-785637) Avail: CASI HC A03/MF A01

A tool for removing and/or replacing bearings in situ is presented which comprises a brace having a first end adapted to engage a first end of the bearing housing, and a second end adapted to engage a second end of the bearing housing. If the two ends of the bearing housing are different in configuration, the respective ends of the brace are correspondingly configured. An elongate guide member integral with the brace has two parts, each projecting endwise from a respective end of the brace. A pressure plate is alternatively removably mountable on either part of the guide member for longitudinal movement therealong, and has first and second ends of different configurations adapted to engage first and second ends respectively of the bearing. A threaded-type drive is cooperative between the guide and the pressure plate to move the pressure plate longitudinally along the guide and apply a force to the bearing, either to remove the bearing from its housing, or to emplace a new bearing in the housing. NASA

N92-30099*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

APPARATUS FOR ELEVATED TEMPERATURE COMPRESSION OR TENSION TESTING OF SPECIMENS Patent Application THOMAS S. GATES, inventor (to NASA) 12 May 1992 8 p (NASA-CASE-LAR-14775-1; NAS 1.71:LAR-14775-1; ÙS-PATENT-APPL-SN-881912) Avail: CASI HC A02/MF A01

In order to support materials selection for the next generation supersonic civilian passenger transport aircraft, a testing apparatus was developed to evaluate certain materials under conditions of high load and elevated temperature. In order to elevate the temperature of the material during standard tension and compression testing the test specimen is surrounded by a pair of supports which include internal heating means. These supports also prevent buckling of the specimen during compression

N92-30106*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THE 1991 INTERNATIONAL CONFERENCE ON AGING AIRCRAFT AND STRUCTURAL AIRWORTHINESS

CHARLES E. HARRIS, ed. Washington Jul. 1992 Conference held in Washington, DC, 19-21 Nov. 1991; sponsored by NASA, Washington and FAA (Contract RTOP 538-02-10-01)

(NASA-CP-3160; L-17094; NAS 1.55:3160) Avail: CASI HC A20/MF A04

Technical sessions of the conference included structural performance, nondestructive evaluation, maintenance and repair, international activities, and commuter airlines. Each session was organized to provide a well-rounded view of the subject from the industry, regulatory, and research perspective. Thirty-four presentations were given by the international technical community.

N92-30107*# Boeing Commercial Airplane Co., Seattle, WA. Structures Engineering Div.

STRUCTURAL INTEGRITY OF FUTURE AGING AIRPLANES
JACK F. MCGUIRE and ULF G. GORANSON In NASA. Langley
Research Center, The 1991 International Conference on Aging
Aircraft and Structural Airworthiness p 33-47 Jul. 1992
Avail: CASI HC A03/MF A04

A multitude of design considerations is involved in ensuring the structural integrity of Boeing jet transports that have common design concepts validated by extensive analyses, tests, and three decades of service. As airplanes approach their design service objectives, the incidences of fatigue and corrosion may become widespread. Continuing airworthiness of the aging jet fleet requires diligent performance from the manufacturer, the airlines, and airworthiness authorities. Aging fleet support includes timely development of supplemental structural inspection documents applicable to selected older airplanes, teardown inspections of high-time airframes retired from service, fatigue testing of older airframes, and structural surveys of more than 130 airplanes operated throughout the world. Lessons learned from these activities are incorporated in service bulletin recommendations, production line modifications, and design manual updates. An overview of traditional Boeing fleet support activities and the anticipated benefits for future generations of commercial airplanes based on the continuous design improvement process are presented.

N92-30109*# Boeing Commercial Airplane Co., Seattle, WA. PERFORMANCE OF FUSELAGE PRESSURE STRUCTURE

JAMES R. MACLIN /n NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 67-74 Jul. 1992

Avail: CASI HC A02/MF A04

There are currently more than 1,000 Boeing airplanes around the world over 20 years old. That number is expected to double by the year 1995. With these statistics comes the reality that structural airworthiness will be in the forefront of aviation issues well into the next century. The results of previous and recent test programs Boeing has implemented to study the structural performance of older airplanes relative to pressurized fuselage sections are described. Included in testing were flat panels with multiple site damage (MSD), a full-scale 737 and 2 747s as well as panels representing a 737 and 777, and a generic aircraft in large pressure-test fixtures. Because damage is a normal part of aging, focus is on the degree to which structural integrity is maintained after failure or partial failure of any structural element, including multiple site damage (MSD), and multiple element damage (MED). Author

N92-30110*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

FRACTURE MECHANICS RESEARCH AT NASA RELATED TO THE AGING COMMERCIAL TRANSPORT FLEET

JAMES C. NEWMAN, JR. and CHARLES E. HARRIS In its The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 75-91 Jul. 1992 Avail: CASI HC A03/MF A04

NASA is conducting the Airframe Structural Integrity Program in support of the aging commercial transport fleet. This interdisciplinary program is being worked in cooperation with the U.S. airframe manufacturers, airline operators, and the FAA. Advanced analysis methods are under development and an extensive testing program is under way to study fatigue crack growth and fracture in complex built-up shell structures. Innovative nondestructive examination technologies are also being developed

to provide large area inspection capability to detect corrosion, disbonds, and cracks. Recent fracture mechanics results applicable to predicting the growth of cracks under monotonic and cyclic loading at rivets in fuselage lap-splice joints are reviewed.

Author

N92-30111*# Harvard Univ., Cambridge, MA. Div. of Applied Sciences.

PRELIMINARY RESULTS ON THE FRACTURE ANALYSIS OF MULTI-SITE CRACKING OF LAP JOINTS IN AIRCRAFT SKINS J. L. BEUTH, JR. and JOHN W. HUTCHINSON In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 93-110 Jul. 1992 Sponsored in part by FAA

(Contract NSF MSM-88-12779) Avail: CASI HC A03/MF A04

Results of a fracture mechanics analysis relevant to fatigue crack growth at rivets in lap joints of aircraft skins are presented. Multi-site damage (MSD) is receiving increased attention within the context of problems of aging aircraft. Fracture analyses previously carried out include small-scale modeling of rivet/skin interactions, larger-scale two-dimensional models of lap joints similar to that developed here, and full scale three-dimensional models of large portions of the aircraft fuselage. Fatigue testing efforts have included flat coupon specimens, two-dimensional lap joint tests, and full scale tests on specimens designed to closely duplicate aircraft sections. Most of this work is documented in the proceedings of previous symposia on the aging aircraft problem. The effect MSD has on the ability of skin stiffeners to arrest the growth of long skin cracks is a particularly important topic that remains to be addressed. One of the most striking features of MSD observed in joints of some test sections and in the joints of some of the older aircraft fuselages is the relative uniformity of the fatigue cracks from rivet to rivet along an extended row of rivets. This regularity suggests that nucleation of the cracks must not be overly difficult. Moreover, it indicates that there is some mechanism which keeps longer cracks from running away from shorter ones, or, equivalently, a mechanism for shorter cracks to catch-up with longer cracks. This basic mechanism has not been identified, and one of the objectives of the work is to see to what extent the mechanism is revealed by a fracture analysis of the MSD cracks. Another related aim is to present accurate stress intensity factor variations with crack length which can be used to estimate fatigue crack growth lifetimes once cracks have been initiated. Results are presented which illustrate the influence of load shedding from rivets with long cracks to neighboring rivets with shorter cracks. Results are also included for the effect of residual stress due to the riveting process itself. Author

N92-30112*# Federal Aviation Administration, Cambridge, MA. National Transportation Systems Center.

CURRENT DOT RESEARCH ON THE EFFECT OF MULTIPLE SITE DAMAGE ON STRUCTURAL INTEGRITY

P. TONG (Hong Kong Univ. of Science and Technology, Kowloon.), KEMAL ARIN, DAVID Y. JEONG, R. GREIF, JOHN C. BREWER, STEPHAN N. BOBO, and SAM N. SAMPATH (Federal Aviation Administration, Atlantic City, NJ.) In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 111-157 Jul. 1992 Avail: CASI HC A03/MF A04

Multiple site damage (MSD) is a type of cracking that may be found in aging airplanes and which may adversely affect their continuing airworthiness. The Volpe National Transportation Systems Center has supported the Federal Aviation Administration Technical Center on structural integrity research for the past two and half years. The work has focused on understanding the behavior of MSD, detection of MSD during airframe inspection, and the avoidance of MSD in future designs. These three elements of the MSD problem are addressed and a summary of the completed work, the current status, and requirements for future research is provided.

N92-30113*# Federal Aviation Administration, Seattle, WA. STATUS OF THE FAA FLIGHT LOADS MONITORING PROGRAM

TERENCE J. BARNES and THOMAS DEFIORE (Federal Aviation Administration, Atlantic City, NJ.) In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 159-185 Jul. 1992

Avail: CASI HC A03/MF A04

In support of the Federal Aviation Administration Aging Aircraft Research Program, the Agency has established a Flight Loads Data Collection Program for Commercial Aircraft. The objectives of this Program are as follows: (1) review existing data collected by other sources including but not limited to U.S., Foreign, Military, etc.; (2) collect current operational usage data from both large and small transport aircraft; and (3) develop criteria for future generations of transports. This paper presents the status of the various programs which are completed, underway or planned. The FAA will be collecting, storing, and analyzing the data which characterize typical commercial transport operations. The airframe manufacturers will handle the task of calculating the loads and stresses.

N92-30114*# Aeronautical Systems Div., Wright-Patterson AFB, OH.

DAMAGE TOLERANCE FOR COMMUTER AIRCRAFT

JOHN W. LINCOLN In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 187-201 Jul. 1992 Avail: CASI HC A03/MF A04

The damage tolerance experience in the United States Air Force with military aircraft and in the commercial world with large transport category aircraft indicates that a similar success could be achieved in commuter aircraft. The damage tolerance process is described for the purpose of defining the approach that could be used for these aircraft to ensure structural integrity. Results of some of the damage tolerance assessments for this class of aircraft are examined to illustrate the benefits derived from this approach. Recommendations are given for future damage tolerance assessment of existing commuter aircraft and on the incorporation of damage tolerance capability in new designs.

N92-30115*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DAMAGED STIFFENED SHELL RESEARCH AT NASA. LANGLEY RESEARCH CENTER

JAMES H. STARNES, JR. and VICKI O. BRITT In its The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 203-220 Jul. 1992

Avail: CASI HC A03/MF A04

The structural behavior of stiffened fuselage shells with local cracks is influenced by the local deformations and stress gradients near the cracks, and this behavior must be understood to predict fuselage structural integrity and residual strength. As a crack grows, the stiffness and internal load distributions in a stiffened shell change, affecting the local deformations and stress gradients near the crack. Transport fuselage shells are designed to support internal pressure and mechanical loads which cause a geometrically nonlinear response. Research is being conducted at NASA LaRC to develop and demonstrate a verified nonlinear stiffened shell analysis methodology for accurately predicting the global and local behavior of nonlinear stiffened fuselage shells with local cracks and with combined internal pressure and mechanical loads. The nonlinear structural analysis methodology being developed and planned at NASA LaRC for damaged stiffened fuselage shells and the experiments being planned to verify this analysis methodology are summarized in the present paper.

N92-30116*# Federal Aviation Administration, Atlantic City, NJ. FEDERAL AVIATION ADMINISTRATION AGING AIRCRAFT NONDESTRUCTIVE INSPECTION RESEARCH PLAN

CHRIS C. SEHER In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural

Airworthiness p 221-229 Jul. 1992 Avail: CASI HC A02/MF A04

This paper highlights the accomplishments and plans of the Federal Aviation Administration (FAA) for the development of improved nondestructive evaluation (NDE) equipment, procedures, and training. The role of NDE in aircraft safety and the need for improvement are discussed. The FAA program participants, and coordination of activities within the program and with relevant organizations outside the program are also described. Author

N92-30117*# Douglas Aircraft Co., Inc., Long Beach, CA. INSPECTION OF AGING AIRCRAFT: A MANUFACTURER'S PERSPECTIVE

DONALD J. HAGEMAIER In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 231-247 Jul. 1992

Avail: CASI HC A03/MF A04

Douglas, in conjunction with operators and regulators, has established interrelated programs to identify and address issues regarding inspection of aging aircraft. These inspection programs consist of the following: Supplemental Inspection Documents; Corrosion Prevention and Control Documents; Repair Assessment Documents; and Service Bulletin Compliance Documents. In addition, airframe manufacturers perform extended airframe fatigue tests to deal with potential problems before they can develop in the fleet. Lastly, nondestructive inspection (NDI) plays a role in all these programs through the detection of cracks, corrosion, and disbonds. However, improved and more cost effective NDI methods are needed. Some methods such as magneto-optic imaging, electronic shearography, Diffractor-Sight, and multi-parameter eddy current testing appear viable for near-term improvements in NDI of aging aircraft.

N92-30118*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THERMAL QNDE DETECTION OF AIRFRAME DISBONDS

WILLIAM P. WINFREE *In its* The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 249-260 Jul. 1992

Avail: CASI HC A03/MF A04

Thermographic characterization of aircraft bonded lap joints offers a quick noncontacting technique to acquire information for structural integrity assessment. This paper discusses recent research to optimize the technique and determine the limits of its applicability. The temperature of the outer surface of the lap joint is increased by the application of heat flux from either flash or quartz lamp heaters. The time dependence of the surface temperature of the lap joint is imaged radiometrically. Measurements are presented for a range of specimens, ranging from samples fabricated with well characterized disbonds to actual aircraft. A technique for processing these images to enhance the contrast between bonded and disbonded regions of the lap joint is presented. Numerical models of the technique simulate the procedure. These simulations provide a cost efficient method for optimizing the technique by varying parameters such as the time for application of heat. These simulations facilitate the definition of parameters difficult to determine experimentally, such as the minimum air gap required for a disbond to be detected. Good agreement between measurements and these simulations is found. Author

N92-30119*# lowa State Univ. of Science and Technology, Ames. Center for Aviation Systems Reliability.

NDE RESEARCH EFFORTS AT THE FAA CENTER FOR AVIATION SYSTEMS RELIABILITY

DONALD O. THOMPSON and LISA J. H. BRASCHE In NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 261-265 Jul. 1992 (Contract W-7405-ENG-82)

Avail: CASI HC A01/MF A04

The Federal Aviation Administration-Center for Aviation Systems Reliability (FAA-CASR), a part of the Institute for Physical Research and Technology at Iowa State University, began operation in the

Fall of 1990 with funding from the FAA. The mission of the FAA-CASR is to develop quantitative nondestructive evaluation (NDE) methods for aircraft structures and materials including prototype instrumentation, software, techniques, and procedures and to develop and maintain comprehensive education and training programs in aviation specific inspection procedures and practices. To accomplish this mission, FAA-CASR brings together resources from universities, government, and industry to develop a comprehensive approach to problems specific to the aviation industry. The problem areas are targeted by the FAA, aviation manufacturers, the airline industry and other members of the aviation business community. This consortium approach ensures that the focus of the efforts is on relevant problems and also facilitates effective transfer of the results to industry.

N92-30120*# Sandia National Labs., Albuquerque, NM. AGING AIRCRAFT NDI DEVELOPMENT AND DEMONSTRATION CENTER (AANC): AN OVERVIEW

PATRICK L. WALTER *In* NASA. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 267-273 Jul. 1992 Sponsored in part by FAA Avail: CASI HC A02/MF A04

A major center with emphasis on validation of nondestructive inspection (NDI) techniques for aging aircraft, the Aging Aircraft NDI Development and Demonstration Center (AANC), has been funded by the FAA at Sandia National Laboratories. The Center has been assigned specific tasks in developing techniques for the nondestructive inspection of static engine parts, assessing inspection reliability (POD experiments), developing testbeds for NDI validation, maintaining a FAA library of characterized aircraft structural test specimens, and leasing a hangar to house a high flight cycle transport aircraft for use as a full scale test bed.

Author

N92-30121*# Sacramento Air Logistics Center, McClellan AFB, CA. Nondestructive Inspection Div.

NONDESTRUCTIVE INSPECTION PERSPECTIVES

DOUGLAS A. FROOM *In NASA*. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 275-278 Jul. 1992 Avail: CASI HC A01/MF A04

This paper presents ideas for consideration by those concerned with commercial aircraft nondestructive inspection (NDI). The perspective is that of an individual with a background in military aircraft NDI, and important differences are indicated between the commercial NDI and military NDI activities. In particular, it is significantly more expensive to implement some new NDI technology, and therefore, in-depth cost-benifit studies for commercial users are recommended.

N92-30132*# Civil Aviation Authority, Canberra (Australia). AGING COMMUTER AEROPLANES: FATIGUE EVALUATION AND CONTROL METHODS

A. J. EMMERSON *In NASA*. Langley Research Center, The 1991 International Conference on Aging Aircraft and Structural Airworthiness p 367-378 Jul. 1992

Avail: CASI HC A03/MF A04

The loss of reliability in aircraft is caused by two broad classes of problems. There are those problems which are self evident and hazardous rather than catastrophic. These are the problem areas where characteristically there have been multiple overhauls, repairs, and replacements, and where aging really means the results of repair ineffectiveness that accumulates. The other class of the problem is the insidious and potentially catastrophic class. It includes the progressive deterioration of items that are not maintained, and often cannot be maintained because the deterioration cannot be seen. It includes the loss of physical properties in adhesives and other organic compounds, corrosion, and the response of repeated loads. Dealt with here is a currently unnecessarily troublesome aspect of that response. Although we must remain concerned about those types of aircraft which have been certified under a design standard or operational rule which embodies the elementary fail-safe concept and which have not been subjected to a subsequent structural audit, the focus here is on types of aircraft for which fatigue and damage tolerance evaluation was not required as a condition of certification.

Author

13

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

A92-46262* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

MICROBURST MODELLING AND SCALING

T. S. LUNDGREN, J. YAO (Minnesota, University, Minneapolis), and N. N. MANSOUR (NASA, Ames Research Center, Moffett Field, CA) Journal of Fluid Mechanics (ISSN 0022-1120), vol. 239, June 1992, p. 461-488. Research supported by University of Minnesota. refs

(Contract NCA2-329)

Copyright

A microburst can be modeled by releasing a volume of fluid that is slightly heavier than the ambient fluid, allowing it to fall onto a horizontal surface. Vorticity develops on the sides of this parcel as it descends and causes it to roll up into a turbulent vortex ring which impinges on the ground. Such a model exhibits many of the features of naturally occurring microbursts which are a hazard to aviation. In this paper this model is achieved experimentally by releasing a volume of salt water into fresh water from a cylindrical dispenser. When care is taken with the release the spreading rate of the surface outflow is measurable and guite repeatable despite the fact that the flow is turbulent. An elementary numerical approximation to this model, based on inviscid vortex dynamics, has also been developed. A scaling law is proposed which allows experiments with different fluid densities to be compared with each other and with the numerical results. More importantly the scaling law makes it possible to compare the model results with real microbursts.

A92-46788

REMOTE MEASUREMENTS OF SUPERCOOLED INTEGRATED LIQUID WATER DURING WISP/FAA AIRCRAFT ICING PROGRAM

B. B. STANKOV, E. R. WESTWATER, J. B. SNIDER, and R. L. WEBER (NOAA, Environmental Research Laboratories, Boulder, CO) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 604-611. Previously cited in issue 06, p. 899, Accession no. A91-19247. refs

(Contract DTFA01-90-Z-02005)

A92-46803

ASSESSMENT OF ONE-DIMENSIONAL ICING FORECAST MODEL APPLIED TO STRATIFORM CLOUDS

ARNOLD TUNICK and HENRY RACHELE (U.S. Army, Atmospheric Sciences Laboratory, White Sands Missile Range, NM) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 703-706. Previously cited in issue 06, p. 899, Accession no. A91-19248. refs

N92-28689# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

ATMOSPHERIC TURBULENCE SPECTRA AND CORRELATION FUNCTIONS

R. NOBACK 13 Jun. 1989 73 p

(Contract OV/RLD-937/1)

(NLR-TP-89217-U; ETN-92-91523) Avail: CASI HC A04/MF A01

The derivation of one, two, and three dimensional spectra and correlation functions for isotropic (atmospheric) turbulence and the

mutual relations were collected from various sources. Aircraft loads usually are determined using a one dimensional turbulence description. In some cases, a two or even three dimensional description might be preferable. Aircraft loads can then be determined using two dimensional spectra and cross spectra. These types of spectra are described, and an outline of methods to determine aircraft loads is given.

N92-29148* National Aeronautics and Space Administration. Pasadena Office, CA.

MICROWAVE TEMPERATURE PROFILER FOR CLEAR AIR **TURBULENCE PREDICTION Patent**

BRUCE L. GARY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 2 Jun. 1992 16 p Filed 27 Nov. 1990 Supersedes N91-23662 (29 - 15, p 2465) (NASA-CASE-NPO-18115-1-CU; US-PATENT-5,117,689; US-PATENT-APPL-SN-618790; US-PATENT-CLASS-73-178R; US-PATENT-CLASS-364-443; US-PATENT-CLASS-374-112; INT-PATENT-CLASS-G01C-21/00) Avail: US Patent and Trademark Office

A method is disclosed for determining Richardson Number, Ri, or its reciprocal, RRi, for clear air prediction using measured potential temperature and determining the vertical gradient of potential temperature, d(theta)/dz. Wind vector from the aircraft instrumentation versus potential temperature, dW/D(theta), is determined and multiplies by d(theta)/dz to obtain dW/dz. Richardson number or its reciprocal is then determined from the relationship Ri = K(d theta)/dz divided by (dW/dz squared) for use in detecting a trend toward a threshold value for the purpose of predicting clear air turbulence. Other equations for this basic relationship are disclosed together with the combination of other atmospheric observables using multiple regression techniques.

Official Gazette of the U.S. Patent and Trademark Office

15

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

A92-44909

LESSONS LEARNED ABOUT INFORMATION MANAGEMENT WITHIN THE PILOT'S ASSOCIATE PROGRAM

CAROL L. JUDGE (USAF, Wright Laboratory, Wright-Patterson IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 85-89. Research supported by DARPA. refs

This paper discusses the lessons learned about information management from work performed to support the Pilot's Associate (PA) program. Within PA information management deals with the flow of information to the pilot and his resultant control responses. It provides control configurations and display formatting that best support the tasks to be accomplished. It is seen that there is the need for the pilot to be able to question the electronic crew member to determine why it reached certain conclusions or made specific recommendations. R.E.P.

A92-44915

SPECIFICATION OF ADAPTIVE AIDING SYSTEMS -INFORMATION REQUIREMENTS FOR DESIGNERS

ROBERT C. ANDES, JR. and WILLIAM B. ROUSE (Search Technology, Inc., Norcross, GA) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 120-125. refs

(Contract F33615-88-C-3612)

Designer's decision making in specifying adaptive aiding systems is considered. A study of design decisions in specifying aiding for a fighter aircraft mission scenario is discussed. Results indicate a high degree of consistency on the part of individual designers. However, there were substantial variations among designers in terms of both decisions made and information used to make the decisions. The implications of these results are considered for types of research studies whose results would be valued by designers. The specific problems facing engineering designers of adaptive aiding systems for advanced aircraft are also addressed. Empirical results of the study and design rules elicited from subjects are presented in terms of a possible belief structure of designers that is used during design.

A92-44982

PUTTING THE CONTROL BACK IN AIR TRAFFIC CONTROL -AN ENHANCED UNIVERSAL DEVELOPMENT SIMULATION

LYNNE NICHOLS (Custom Simulation Solutions Corp., Hurst, TX) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 1. Columbus, OH, Ohio State University, 1991, p. 544-549. refs (Contract DTFA-02-90-C-90583)

A review is presented of the Universal Development Simulation System (UDSS) which will give air traffic controllers real 3D pictures of an aircraft's location. This system will provide controllers and pilots instant maps detailing buildings, towers and runways, radio beacons, both high and low altitude airways and all other necessary information to land at an airport. UDSS employs computer simulation's power to let users plan air traffic improvements such as traffic increases on existing runways, construction of new runways, and the remapping of airways for both of these improvements. R.E.P.

A92-45002

SAFETY VS. ECONOMY, SYSTEM-THEORETIC APPROACH TO THE PROBLEM ANALYSIS

JANUSZ M. MORAWSKI (Academy of Physical Education, Gdansk. IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 679-684. Research supported by LOT Polish Airlines. refs

The multilevel, hierarchical structure of an airline company calls for the use of safety factors-related analyses that are consonant with system-theoretic considerations. While pilots see safety as a directly evident and explicit affair, managers have a more economic appreciation of safety hazards. It is presently shown that such competing perspectives can be reconciled through adherence to the 'scales conformity rule', which requires that information be conveyed at various organizational levels in language appropriate to the scale of operations of those for whom it is intended. O.C.

A92-45064

KNOWLEDGE-SENSITIVE TASK MANIPULATION - ACQUIRING KNOWLEDGE FROM PILOTS FLYING A MOTION-BASED **FLIGHT SIMULATOR**

JOHN R. BLOOMFIELD (Honeywell Systems and Research Center, Minneapolis; Hamline University, Saint Paul, MN), VALERIE L. SHALIN (New York, State University, Buffalo), and WILLIAM H. CORWIN (Honeywell Systems and Research Center, Minneapolis, IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 1068-1073. refs

The domain expert is a major source of knowledge for the designers and developers of automation aids, expert systems, and human-machine interface systems. The process of acquiring knowledge from experts has been highly time-intensive and the resultant knowledge base is often incomplete. An approach to knowledge acquisition that is designed to lead to a more rapid acquisition of information, and to produce a more complete and detailed knowledge base is developed. This approach involves the manipulation of the conditions under which an expert performs. This approach was tested using as the present domain experts four commercial airline pilot training instructors. Their ability to access cockpit instruments while they were flying a Phase II certified, six-degree-of-freedom, motion-based MD-80 flight simulator was varied. The instructors were available for only two hours each. However, using the present knowledge-sensitive task-manipulation approach for a total of eight hours in the simulator environment, large amounts of substantive, detailed knowledge were obtained.

A92-45454 MANUAL CONTROL OF VEHICLES WITH TIME-VARYING DYNAMICS

NORIHIRO GOTO (Kyushu University, Fukuoka, Japan) and HIROYUKI MATSUMOTO (Toshiba Co., Komukai Works, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 863-869. refs (SAE PAPER 912078) Copyright

An experiment was conducted to seek the models of the human pilot controlling a vehicle with time-varying dynamics manually. In the experiment the human pilot controlled basic first-order linear time-varying controlled elements in a compensatory closed-loop fashion for step and random inputs. The analysis of the experimental data has found that for the step input case the human pilot can be modeled as a stationary proportional-plus-integral controller, whereas for the random input case a stationary model with constant coefficients cannot describe the pilot's control behavior sufficiently well. A nonstationary time series analysis suggests that the human pilot's control behavior for the random input case is also time-varying; adapting his characteristics to the changing controlled element dynamics in such a manner that the error and output spectral characteristics do not make appreciable changes with respect to time. Author

A92-45456

A DESIGN OF STRONGLY STABILIZING CONTROLLER

MASAYUKI SUZUKI, SHOHEI NIWA, and SHIN OKAZAWA (Nagoya University, Japan) IN: International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings. Warrendale, PA, Society of Automotive Engineers, Inc., 1991, p. 883-889. refs (SAE PAPER 912081) Copyright

A new convenient method for the design of strongly stabilizing controllers is presented. The method is derived by applying the quadratic stabilization method which is developed for the robust stabilization of uncertain systems. Some examples illustrating the design method's effectiveness are adduced.

C.A.B.

A92-45489*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

FUTURE DIRECTIONS IN COMPUTING AND CFD

F. R. BAILEY and HORST D. SIMON (NASA, Ames Research Center, Moffett Field, CA) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 149-160. refs (Contract NAS2-12961)

(AIAA PAPER 92-2734) Copyright

In recent years CFD on massively parallel machines has become a reality. This paper summarizes some recent trends both in high performance computing, and in CFD using parallel machines. The long term computational requirements for accomplishing some of the large scale problems in computational aerosciences, and current hardware and architecture trends are discussed. Performance results obtained from the implementation of some CFD applications on the Connection Machine CM-2 and the Intel iPSC/860 at NASA Ames Research Center are presented. It is argued that only massively parallel machines will be able to meet these grand challenge requirements.

A92-45492#

THE DESIGN OF A SYSTEM OF CODES FOR INDUSTRIAL CALCULATIONS OF FLOWS AROUND AIRCRAFT AND OTHER COMPLEX AERODYNAMIC CONFIGURATIONS

J. W. BOERSTOEL, S. P. SPEKREIJSE (National Aerospace Laboratory, Amsterdam, Netherlands), and P. L. VITAGLIANO (Alenia Aeronautica, Pomigliano d'Arco, Italy) IN: AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pt. 1. Washington, DC, American Institute of Aeronautics and Astronautics, 1992, p. 181-191. Research supported by Netherlands Agency for Aerospace Programs. refs (AIAA PAPER 92-2619) Copyright

For industrial calculations of 3D flows around transport aircraft, a system of CFD codes for flow calculations is developed. This system includes codes for aerodynamic geometry modeling in block-decomposition work, multiblock grid generation, Euler and Navier-Stokes flow calculations, and flow visualization. The codes are tuned to each other. Two examples of this tuning are discussed. Analytic representations for geometric shapes of aerodynamic curves and surfaces are presented that may be used for several tasks in CFD work (geometric modeling of block faces and edges, analytic surface representation in grid generators aerodynamic modeling of surface, refacing of aerodynamic configuration surfaces). Multiblock grid generation is simplified by allowing grid lines to be only C0-continuous over block faces. Block-coupling algorithms for the flow solvers are discussed, that prevent accuracy loss due to the nonsmoothness of the grid over block faces.

Author

A92-45589#

A FAST, IMPLICIT UNSTRUCTURED-MESH EULER METHOD JOHN C. VASSBERG (Southern California, University, Los Angeles, CA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 16 p. refs (AIAA PAPER 92-2693) Copyright

An efficient, time-accurate, unstructured-mesh Euler method is presented. The method is based on an implicit system of equations which is unconditionally stable; each time advance of the implicit problem is solved in an efficient manner with a modified multigrid scheme. The present method introduces an automated approach for defining the sequence of unstructured meshes required for the multigrid algorithm. Other techniques which increase computer throughput for unstructured-mesh problems are also discussed. An NACA 0012, steady-state, grid-adapted solution is provided to illustrate the convergence properties of the multigrid scheme. An unsteady solution about an NACA 64A010 airfoil, pitching in the flutter regime, is included and compared with test data. Author

A92-46629

THE METHOD OF DETERMINANT EQUATIONS IN THE APPLIED THEORY OF OPTIMAL SYSTEMS - SYSTEMS WITH 'RIGID' CONSTRAINTS AND WITH FIXED BOUNDARY CONDITIONS [METOD DETERMINANTNYKH URAVNENII V PRIKLADNOI TEORII OPTIMAL'NYKH SISTEM - SISTEMY S 'ZHESTKIMI' OGRANICHENIIAMI I S ZAKREPLENNYMI KRAEVYMI USLOVIIAMI]

S. O. SIMONIAN (Erevanskii Politekhnicheskii Institut, Yerevan, Armenia) Elektronnoe Modelirovanie (ISSN 0204-3572), vol. 14, May-June 1992, p. 9-14. In Russian. refs Copyright

A method is proposed for the solution of the Feldbaum problem in linear problems of optimal speed of response in the case of real eigenvalues of the matrix of the system of main variables. The problem of oscillations around the center of gravity of an autopiloted aircraft is considered as an example.

A92-46748

LINEAR QUADRATIC MINIMAX CONTROLLERS

LAURENT E. GHAOUI, ALAIN CARRIER, and ARTHUR E. BRYSON, JR. (Stanford University, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 953-961. refs Copyright

Minimax methods are proposed for the analysis and design of controllers for the best controls with the worst initial conditions, worst parameter changes with specified quadratic norms, and worst disturbances with specified integral-square norms. The worst initial conditions are the only forcing functions; disturbances are regarded as an added set of feedback controls whose magnitudes are limited by negative weights in the performance index. The minimax value of the performance index is easily calculated as the maximum eigenvalue of a steady-state Liapunov or Riccati matrix. There is a lower bound on the disturbance weights in the performance index; at this bound, the controller design is identical to the H-infinity controller design. There is also an upper bound on the norm of the parameter changes; at this value, the closed-loop system goes unstable, and the corresponding parameter change vector is almost the same as the corresponding vector obtained by 'real mu' analysis, the only difference being the use of a quadratic norm instead of an infinity norm.

A92-46762

TWO VARIATIONS OF CERTAINTY CONTROL

SALVATORE ALFANO (U.S. Air Force Academy, Colorado Springs, CO) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 15, no. 4, July-Aug. 1992, p. 1040-1043. refs

Two variations of certainty control were investigated in order to determine their ability to minimize lateral velocity changes of a hypervelocity orbital vehicle in a head-on, 10-deg out-of-plane intercept. The first variation used a control effectiveness ratio to regulate thrusting times, whereas the second variation changed the spherical constraint function to an ellipsoidal one. Neither variation simultaneously reduced maneuvering cost and miss distance compared with the original formulation of certainty control. This indicates that the original formulation effectively uses the state deviations to minimize maneuvering coasts while maintaining a high level of accuracy. The ellipsoidal variation demonstrated a tradeoff in accuracy to reduce maneuvering costs, a choice to be made based on mission constraints.

A92-46817 National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

WIND-TUNNEL COMPRESSOR STALL MONITORING USING NEURAL NETWORKS

CHING F. LO and G. Z. SHI (Tennessee, University, Tullahoma) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 736-738. Research supported by USAF and University of Tennessee-Calspan Center for Space Transportation and Applied Research. Previously cited in issue 18, p. 3181, Accession no. A91-44266. refs

(Contract NAG2-596; NAGW-1195) Copyright

A92-47035

NUMERICAL GRID GENERATION IN COMPUTATIONAL FLUID DYNAMICS AND RELATED FIELDS; PROCEEDINGS OF THE 3RD INTERNATIONAL CONFERENCE, UNIVERSIDAD POLITECNICA DE CATALUNA, BARCELONA, SPAIN, JUNE 3-7, 1991

A. S. ARCILLA, ED., J. HAEUSER, ED. (ESTEC, Noordwijk, Netherlands), P. R. EISEMAN, ED. (Columbia University, New York; Program Development Corp., White Plains, NY), and J. F. THOMPSON, ED. (NSF, Engineering Research Center for Computational Field Simulation, Mississippi State, MS) Conference sponsored by CICYT, Instituto Nacional de Tecnica Aeroespacial of Spain, CEC, et al. Amsterdam and New York, North-Holland, 1991, 1011 p. For individual items see A92-47036 to A92-47097. (ISBN 0-444-88948-5) Copyright

Various papers on numerical grid generation in CFD and related fields are presented. The general topics addressed are: adaptive structured and unstructured grid generation, aerospace applications, internal flow configuration, general applications, interactive grid generation, structured and unstructured grid generation, grid quality, hydrodynamic applications, grids of mixed structure, and surface grid generation.

C.D.

A92-47043

ANISOTROPIC CONTROL OF MESH GENERATION BASED UPON A VORONOI TYPE METHOD

M. G. VALLET (INRIA, Le Chesnay; Dassault Aviation, Saint-Cloud, France), F. HECHT (INRIA, Le Chesnay, France), and B. MANTEL (Dassault Aviation, Saint-Cloud, France) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 93-103. refs

An automatic mesh generator whose data is the solution of a previous computation is proposed. A directional error estimator leads to the definition of a control space including some anisotropic information, or equivalently a Riemannian metric for mesh regeneration. The mesh fineness is controlled by creating points and its stretch by swapping edges. The obtained meshes are adapted to the given solution and can be constituted on stretch elements.

Author

A92-47050

ADAPTIVE PARALLEL MESHES WITH COMPLEX GEOMETRY

ROY WILLIAMS (California Institute of Technology, Pasadena) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 201-213. refs Copyright

The automatic creation and adaptive refinement of an unstructured mesh within a complex geometry such as the space surrounding an airplane are discussed. This may be formulated as two distinct parts; a nonparallel part requiring global knowledge which automatically creates a coarse compatible mesh, and a parallel local refinement algorithm, which refines the mesh until simulation can begin, then adaptively refines it according to the progress of the simulation. Background-mesh methods, sequential and parallel, offer some promise if good numerical algorithms are available. Sequential advancing front methods combined with the parallel Rivara refinement algorithm are a good choice. Author

A92-47051* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

GRIDDING STRATEGIES AND ASSOCIATED RESULTS FOR WINGED ENTRY VEHICLES

K. J. WEILMUENSTER, R. E. SMITH, and E. L. EVERTON (NASA, Langley Research Center, Hampton, VA) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 217-228. refs

Copyright

Two volume grid strategies based on similar software are presented for a geometrically complex entry vehicle. It is shown that quick relatively simple grid generation techniques can be used to construct computational grids about entry vehicles with nontrivial geometric complexity. Particular attention is given to both single-and dual-block grid topologies for a lifting body and solution generated on each grid. Results indicate that the grid topology can have an effect on the nature of the solution.

A92-47053

AN UNSTRUCTURED MESH GENERATION ALGORITHM FOR THREE-DIMENSIONAL AERONAUTICAL CONFIGURATIONS

LUCA FORMAGGIA (Alenia Aeronautics, Turin, Italy) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 249-260. refs

Copyright

An unstructured 3D mesh generation strategy aimed at solving compressible flows around aeronautical configurations is presented. The proposed algorithm is based on a front advancing technique. Nodes and elements of the mesh are generated at the same

time in accordance to a predefined mesh density distribution. It is concluded that unstructured grid-based methodologies are capable of providing a useful tool for complex 3D aerodynamical analysis.

D.G

A92-47055* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

GRID GENERATION AND COMPRESSIBLE FLOW COMPUTATIONS ABOUT A HIGH-SPEED CIVIL TRANSPORT CONFIGURATION

J. S. ABOLHASSANI, J. E. STEWART, N. FARR (Computer Sciences Corp., Hampton, VA), R. E. SMITH, P. W. KERR, and E. L. EVERTON (NASA, Langley Research Center, Hampton, VA) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 273-285. refs

Copyright

Techniques and software are discussed for generating grids about a high-speed civil transport configuration. The configuration is defined by a computer-aided design system in wing, fuselage, tail and engine-nacelle components. Grid topology and the surfaces outlining the blocks of the topology are computed with interactive software. The volume grid is computed using software based outransfinite interpolation and Lagrangian blending functions. Several volume grids for inviscid and viscous flow have been generated using this system of codes. Demonstration flowfields around this vehicle are described.

A92-47066 INTERACTIVE GENERATION OF STRUCTURED/UNSTRUCTURED SURFACE MESHES USING ADAPTIVITY

Y. LAUZE, R. CAMARERO, and H. YANG (Ecole Polytechnique, Montreal, Canada) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 491-502. Research supported by Canadair Group Bombardier, Inc., and Centre de Recherche Informatique de Montreal. refs

An adaptive meshing procedure for unstructured grids has been developed which is based on objective mesh functions, namely, grid density and grid elongation functions. Kriegging techniques are used to specify and evaluate the grid functions. The proposed procedure iteratively refines or coarsens the grid locally based on the value of the objective mesh function. The initial mesh is generated by a transfinite interpolation. The convergence to a final surface grid that matches the required characteristics is based on triangular subdivision, node relaxation, node reconnection and degeneration control. This procedure has been implemented in an integrated computer software package for a case of a wing-fuselage configuration.

O.G.

A92-47069

SIMPLE DIAGNOSIS FOR THE QUALITY OF GENERATED GRID SYSTEMS

SUSUMU SHIRAYAMA (Institute of Computational Fluid Dynamics, Tokyo, Japan) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 547-555. refs

Copyright

A simple diagnosis is proposed for the quality of a grid system in a flow solver based on generalized curvilinear coordinates. It is shown that an efficient improvement of the grid system is accomplished by using this diagnosis. The diagnosis consists of three parts: searching a model equation which has a characteristic feature of the Navier-Stokes equations, solving the model equation effectively, and identifying the region to be improved. One grid system modification cycle is complete with this diagnosis in a few

minutes using a scalar computer with a speed of about 5 MFLOPS. C.D.

A92-47078

PATCH-INDEPENDENT STRUCTURED MULTIBLOCK GRIDS FOR CFD COMPUTATIONS

JOSE M. DE LA VIUDA (Construcciones Aeronauticas, S.A., Division de Proyectos, Getafe, Spain), JEAN DIET (Aerospatiale, Division Engins Tactiques, Chatillon, France), and GILBERT RANOUX (Control Data France, Paris) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 703-715. refs

Copyright

The process of generating a patch-independent structured multiblock grid starting from a CAD surface definition is described. The grid topology and parameters are first defined within the available CAD system, and the grid generator and previously extracted data are then used to generate the body-fitted grid. Some examples are shown.

C.D.

A92-47081

GENERATION OF EFFICIENT MULTIBLOCK GRIDS FOR NAVIER-STOKES COMPUTATIONS

TORSTEN BERGLIND and PETER ELIASSON (Aeronautical Research Institute of Sweden, Bromma) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 769-780. refs

Copyright

The aim of this work is to develop a general purpose system that converts a previously generated multiblock Euler grid to a multiblock Navier-Stokes grid. The basic concept is first to displace the surface grids at the configuration in the normal direction a distance that corresponds to the thickness of the boundary layer. Grid points in previously generated blocks are adjusted to these new boundaries by transfinite interpolation. New blocks are inserted in the void between each displaced grid surface and the original grid surface. The out-of-surface grid lines will thereby become almost orthogonal to the configuration surface. The use of O-O topology is ideal to resolve the boundary layer, since grid points are added only in the vicinity of the solid walls. An example of generation of a Navier-Stokes grid around the new Swedish fighter aircraft JAS 39 Gripen is demonstrated.

A92-47083

A GEOMETRY-INTEGRATED APPROACH TO MULTIBLOCK GRID GENERATION

KEVIN L. SMIT and T. Y. SU (Boeing Commercial Airplane Group, Seattle, WA) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 795-803.

Copyright

CFD is widely used to obtain detailed descriptions of the flowfields around aircraft. This paper describes an approach to multiblock grid generation in CFD in which geometry continuity is maintained and the required grid generation capability is produced using the Aero Grid and Paneling System (AGPS). The process is geometrically accurate throughout, with grid points representing the geometrical surface being extracted directly from the original surface lofts. The approach reduces or eliminates development and purchase costs because the AGPS source code is not modified. A playback feature of the approach allows jobs to be repeated. Engineering time is saved for the inexperienced user, for the first-time configuration, and for the aircraft design cycle.

A92-47089

THE CONSTRUCTION, APPLICATION AND INTERPRETATION OF THREE-DIMENSIONAL HYBRID MESHES

J. A. SHAW, J. M. GEORGALA, A. J. PEACE, and P. N. CHILDS (Aircraft Research Association, Ltd., Bedford, England) IN: Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Barcelona, Spain, June 3-7, 1991. Amsterdam and New York, North-Holland, 1991, p. 887-898. Research supported by Ministry of Defence Procurement Executive. refs

hybrid structured-unstructured approach to mesh generation, whereby regions of regularly ordered hexahedral elements are combined with irregularly arranged tetrahedral volumes, offers the potential of attaining a harmonious balance between mesh quality, efficiency and flexibility. In this paper, techniques developed for the generation, use and graphical analysis of such hybrid meshes are discussed. The structured regions of mesh are constructed using the multiblock approach, while the unstructured regions are defined using the Delaunay algorithm. These regions of alternative mesh type are interfaced using an explicitly defined layer of tetrahedral and pentahedral elements. Examples of the application of the hybrid grid approach are shown for both civil and military aircraft. Particular emphasis on the interpretation of hybrid meshes is given to the creation of, and interpolation of data onto, planes through the grid and the visualization of all mesh elements within a given region.

A92-47534 DOUBLE DENSITY RECORDING ACQUISITION AND PLAYBACK

PAUL ROTH (Datatape, Inc., Pasadena, CA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 433-448. Copyright

This paper discusses signal performance of longitudinal Double Density acquisition recordings made on flight recorders and reproduced on a single laboratory ground station recorder. It includes comparisons with standard bandwidth recording signal performance.

Author

A92-47535

INTERNATIONALIZATION OF TELEMETRY SYSTEMS

WILLIAM ANDERSON (Loral Data Systems, Sarasota, FL) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 449-454. refs Copyright

The importance of providing local language user interfaces on telemetry systems is emphasized. Attention is then given to two basic approaches to converting systems to a foreign language interface: localization and internationalization. The discussion covers character sets, user-defined characters, input method, collating sequence, date and time, numeric formats, monetary symbols, terminals and printrs, standards, and implementation.

V.I

A92-47537

NEW BOEING FLIGHT TEST DATA ACQUISITION SYSTEMS

LEE H. ECCLES and LAWRENCE A. MALCHODI (Boeing Commercial Airplane Group, Seattle, WA) IN: ITC/USA/'91; Proceedings of the International Telemetering Conference, Las Vegas, NV, Nov. 4-7, 1991. Research Triangle Park, NC, Instrument Society of America, 1991, p. 463-469.

Two new data acquisition systems are described. One of these systems will be used to investigate problems on aircraft which are being flown by the airlines in normal airline service. The second system is intended for use as the data acquisition system during the certification of the new 777 airplane. The two systems will differ in physical size, capacity, and the recorder being used. They are expected to use as much of the same hardware and software as possible. This paper discusses the design of both systems.

Author

A92-48220

AN EXPLANATION-BASED-LEARNING APPROACH TO KNOWLEDGE COMPILATION - A PILOT'S ASSOCIATE APPLICATION

KEITH R. LEVI (Maharishi International University, Fairfield, IA), DAVID L. PERSCHBACHER (Alliant TechSystems, Inc., Minneapolis, MN), MARK A. HOFFMAN (ISX Corp., Westlake Village, CA), CHRISTOPHER A. MILLER, BARRY B. DRUHAN (Honeywell Systems and Research Center, Minneapolis, MN), and VALERIE L. SHALIN (New York, State University, Buffalo) IEEE Expert (ISSN 0885-9000), vol. 7, no. 3, June 1992, p. 44-51. refs

(Contract F33615-88-C-1739)

Copyright

The application of explanation-based learning as part of a larger knowledge compilation system for automating the development and maintenance of associate knowledge bases is addressed. Knowledge compilation restructures an existing system or knowledge base to increase usability, efficiency and consistency. Attention is given to the Pilot's Associate system, a coordinated suite of five expert systems that help the pilot of an advanced tactical fighter aircraft.

R.E.P.

A92-48440

A HIGH PERFORMANCE GENERAL PURPOSE PROCESSING ELEMENT FOR AVIONIC APPLICATIONS

MARK S. RUSSELL, JAMES C. HANSEN (Unisys Electronic and Information Systems Group, Eagan, MN), and LAWRENCE J. MERBOTH (AT&T Bell Laboratories, Whippany, NJ) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 153-159.

Copyright

The Unisys/AT&T General Purpose Processing Element (GPPE) module is described. The GPPE, which is based upon next-generation reduced instruction set computer (RISC) microprocessor technology, combines the 32-b instruction set architecture (ISA) and 33-MHz operation. Using a commercial ISA and open architecture results in the most cost-effective, full-featured, militarized design available on a single-width SEM-E module. Other GPPE features include a multilayer data security mechanism and extensive features to protect classified data. The 6 Mbytes of SRAM and 512 kbytes of EEPROM available on the GPPE are consistent with large RISC addressing spaces and real-time operating system requirements. Support of the Joint Integrated Avionics Working Group two-level maintenance concepts is provided.

A92-48447

GLOBAL MEMORY IN THE PAVE PACE ARCHITECTURE

KENNETH R. LEEPER (Boeing Defense and Space Group, Seattle, WA) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 221-226. refs
Copyright

The Boeing Company is involved in independent research and development activity targeted at studying the partitioning and system control protocols of the Pave Pace architecture. One aspect of the system being investigated is the use of data coupling, involving the implementation of a globally accessible memory called the system virtual memory (SVM) for each computational bus in the system. The use of this SVM would have a dramatic impact on system control protocols, fault tolerance, and software partitioning in the resulting system design. The SVM described here is a version formalized from the Air-to-Air Attack Management contract. Specific topics include a conception description of the SVM; a summary of its operation and intended use; and its impact on system control protocols, fault tolerance and failure recovery, and software partitioning.

A92-48485 SYSTEMS SIMULATION OF AN ADVANCED AVIONICS COMSEC UNIT

LILLY BONDIE and BRIAN DEITRICH (Motorola, Inc., Government Electronics Group, Scottsdale, AZ) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 1. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 480-484.

The authors discuss JAID (JIAWG/AACU Interoperability Demonstration), the simulation of the AACU (Advanced Avionics COMSEC Unit) in an integrated avionics system. The AACU is the next generation of avionics COMSEC (communications security) devices. The simulation model of the AACU involves doing a gate-level model of the AACU bus interface hardware and a behavioral model of the functionality of the rest of the AACU. The AACU functionality demonstrated by the behavioral model involves emulating custom LSI and several microprocessors which perform the black box COMSEC functionality of the AACU. The behavioral model emulates the correct timing, state transition, and COMSEC functionality of the AACU. Issues involved in writing a behavorial model for a mixed-mode (behavioral and gate-level) simulation are emphasized here.

A92-48489

APPLYING ADVANCED DIGITAL SIMULATION TECHNIQUES IN DESIGNING FAULT TOLERANT SYSTEMS

VINCENT P. CALANDRA (Protocol, Mt. Olive, NJ) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 508-514. Research supported by USAF. refs Copyright

Protocol, a services organization that is providing simulation solutions for the development of digital systems, is discussed. By leveraging the latest in design simulation technology. Protocol has addressed the problems associated with integrating today's most complex systems. The author describes the capabilities developed by Protocol, and how they can be applied to the development of complex fault-tolerant systems. It is noted that the methodologies and techniques developed and applied by Protocol have proven that anomalies in system designs can be located and corrected early in the development process through the use of gate level system simulation (GLSS). Protocol's concurrent hardware and software enabler (CHASE) provides the ability to debug software running on gate-level models of system hardware, thereby providing a software/hardware integration environment prior to fabrication. GLSS and CHASE together provide powerful capabilities needed by today's fault tolerant system designer.

A92-48502

AVIONICS SOFTWARE REUSABILITY OBSERVATIONS AND RECOMMENDATIONS

BRIAN J. SHELBURNE (Wittenberg University, Springfield, OH) and MARC J. PITARYS (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 614-619. refs (Contract F49620-88-C-0053)

Attention is given to the Common Ada Missile Packages (CAMPs), a large collection of generic real-time embedded missile software that allows users to implement many applications, such as navigation routines, Kalman filters, and mathematical operations. In addition to a library of Åreusable' software, a parts engineering system (PES) was developed under the CAMP program. The use of CAMP for avionics software applications was investigated. It was found that CAMP in its current state was not suitable for avionics applications. The attempts to create avionics software with CAMP led to an abundance of observations concerning the writing and use of reusable software for avionics applications. The results of the avionics software reuse research are described. The authors also identify some of the errors found in the CAMP

software and list recommendations that need to be adopted if widescale application of reusable software is to be a success.

I.E.

A92-48506

A NEW DEVELOPMENT IN EMBEDDED COMPUTER PERFORMANCE MEASUREMENT

DIANE KOHALMI, JOHN NEWPORT (U.S. Navy, Naval Avionics Center, Indianapolis, IN), DIANE PAUL, CHUCK ROARK, and DAVID G. STRUBLE (Texas Instruments, Inc., Defense Systems and Electronics Group, Dallas) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 633-639.

The authors report on the results of Phase I of the Advanced Avionics Technology Demonstration (AATD) Embedded Computer Performance Measurement (ECPM) program being performed by Texas Instruments (TI) for the Naval Avionics Center (NAC). During Phase I of the AATD program, novel techniques were developed to measure spare processing throughput and I/O for use in comparing different embedded computer systems and to measure spare processing throughput and spare I/O percentages in support of US government standards such as TADSTAND D, which defines Navy policy requirements for computer reserves. TI used its MIL-STD-1750A based Mission Display Processor (MDP), developed for the YF-22 ATF DEM/VAL program, as the initial target computing system for this effort. The cornerstone of the benchmark is a NAC developed navigation program which was hosted on a VAX and retargeted by TI to its MDP.

A92-48513

EXPERT AVIONICS CODE MODIFICATION

JAMES S. WILLIAMSON (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 677-680. refs

A description is given of the Expert Avionics Code Modification (EACM) system, a software environment and a collection of embedded tools which function together to provide a capability for post-development support for avionics software written in the Ada programming language. The EACM system includes four main tools: Connectivity Analyzer (CA), Code Performance Anomaly Detector (CPAD), Shuffler, and Rippler (Side-Effect Analyzer). The purpose of this Ada avionics maintenance/enhancement system is to reduce the amount of resources (i.e., time, cost, and manpower) required to maintain software for processors utilized in avionics applications. Anticipated benefits of the EACM system include increased and easier program understanding, leading to a lower learning curve for new project members; fewer maintenance-generated Åbugs'; and more expedient and less costly enhancements.

A92-48515 VERIFICATION AND VALIDATION OF F-15 AND S/MTD UNIQUE SOFTWARE

F. L. TUTTLE and R. L. KISSLINGER (McDonnell Aircraft Co., Saint Louis, MO) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 690-697.

Four separate operational flight programs (OFPs) were developed by five vendors, using seven computer languages, and were integrated for use in the STOL (short takeoff and landing)/Maneuver Technology Demonstrator (S/MTD). The verification and validation (V & V) process used was very successful, as evidenced by the fact that very few problems have been encountered during the test program, and no flights were delayed as a result of software anomalies. The authors provide an overview of the V & V approach used by MCAIR and its suppliers. The approach is not a management breakthrough; rather, it is the application of well-known, but often neglected, principles of

engineering management, particularly attention to detail. Emphasis is placed on the V & V of the flight critical software for the flight controllers.

A92-48518

PARTITIONED SOFTWARE SUPPORT CONCEPT FOR MODULAR EMBEDDED COMPUTER SOFTWARE

RICHARD E. NEESE, A. S. BRANTLEY, and MARC J. PITARYS (USAF, Wright Laboratory, Wright-Patterson AFB, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 709-716. refs

(Contract F33615-88-C-1713)

The authors describe research directed at defining a partitioned software support concept for modular embedded computer software (ECS) for distributed, fault-tolerant avionics ECS architectures. In particular, they describe the research, model definition, and prototype development for a preliminary modular ECS partitioned software support concept. It is noted that new approaches in this area must emphasize modifications of behavioral rather than static aspects of mission profile components. The foundation is a software information representation scheme which handles the convoluted mappings between mission scripts, operational flight program software components, and processing hardware elements. It must cater to both the operating command (e.g., TAC) and the supporting command (AFLC) perspectives and provide automated application generators which expedite definition and implementation of mission scripts.

A92-48520

A NEURAL NETWORK BASED POSTATTACK DAMAGE ASSESSMENT SYSTEM

PAUL WANG and LIONEL MENEGOZZI (ITT Avionics, Nutley, NJ) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 724-729. refs Copyright

Key elements of an automated damage assessment (ADA) will include ground-based sensors to survey and measure postattack damages, communication networks to link sensors, a survival recovery center (SRC), a runway repair team (or robots) for rapid response, and advanced signal processors to perform the search and optimization processes for the 'best' airbase recovery plan. To meet the USAF ADA requirements, ITT Avionics has proposed the development of a hybrid signal processor. The system will consist of algorithmic processors and neural networks. To improve DA performance, key DA functions are implemented by neural networks. Due to the intrinsic nature of distributed processing power, the neural network not only provides the high throughput required for DA but it also achieves fault tolerance and graceful degradation, which are extremely important for the Rapid Runway Repair program.

A92-48527

IDENTIFYING DESIGN REQUIREMENTS USING INTEGRATED ANALYSIS STRUCTURES

DANIEL E. SNYDER (Research Designs, Inc., Beavercreek, OH), MICHAEL D. MCNEESE (USAF, Armstrong Laboratory, Wright-Patterson AFB, OH), and BRIAN S. ZAFF (Logicon Technical Services, Inc., Dayton, OH) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 786-792. refs Copyright

The authors present some of the analytical and design foundations for an integrated analysis structure for knowledge acquisition and design. Concept maps, IDEF (integrated computer-aided manufacturing definition), and storyboards are combined into an integrated structure for knowledge representation, called cognitive maps, and a hypermedia-based analytical

framework is established using graphical spreadsheets. The authors describe the preliminary results of a project to define this hypermedia environment and integrated software.

A92-48557

THE APPLICATION OF MULTIMEDIA EXPERT SYSTEMS TO THE DEPOT LEVEL MAINTENANCE ENVIRONMENT

BRIAN FORD and IRA GORDON (AIL Systems, Inc., Melville, NY) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 1038-1041.

The authors assert that depot level bench maintenance and repair can be significantly improved through the use of integrated multimedia expert systems. These integrated systems take advantage of advances in computer interface technology to provide the technician with text, still and full-motion graphics, animation, and sound. The authors present some of their experiences in developing this type of system to provide technical support for depot level maintenance. Specifically, the authors participated in the development of an expert system that is used by bench technicians to isolate and repair faults in analog shop replaceable units (SRUs) used in the avionic subsystem of a military aircraft. The SRU Test and Diagnostics Expert System was developed to perform fault isolation and troubleshooting using standard bench equipment, such as an oscilloscope, digital voltmeter and an SRU specific test set. I.E.

A92-48565

AIRCRAFT ROUTE OPTIMIZATION USING ADAPTIVE SIMULATED ANNEALING

KEITH KASTELLA (Unisys Corp., Electronic and Information Systems Group, Eagan, MN) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 1123-1129. refs Copyright

It is demonstrated that simulated annealing (SA) is a viable optimization method for use in route optimization for aircraft flying in tactical attack roles at low altitude deep in enemy territory. It is found that adaptive control of the temperature based on a heuristic measure of equilibrium greatly reduces the algorithm's sensitivity to the cooling rate while giving a 5- to 10-fold speed-up with no adverse impact on the quality of the solutions produced. These results scale nearly linearly with problem size.

A92-48569

DEVELOPING INTELLIGENT AUTOMATIC TEST EQUIPMENT

WILLIAM R. SIMPSON and JOHN W. SHEPPARD (Arinc Research Corp., Annapolis, MD) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 1206-1213. refs

The authors discuss internal research of the past 10 years which led to the evolution of several maintenance tools and an architecture for intelligent ATE (automatic test equipment). Specifically, the objectives of the research program, some of its results, and its current applications are reviewed. A demonstration intelligent ATE system consisting of a Racal-Dana VXI, instruments-on-a-board automatic test unit for an AV8B power supply is described, and the capabilities of this system and its implications for more generic ATE architectures are discussed.

I.E.

A92-48794#

BUWICE - AN INTERACTIVE ICING PROGRAM APPLIED TO ENGINE INLETS

SCOTT EBERHARDT, BYOUNGSOO KIM, HONAM OK, WEI-LIN LI, DAVE TAFLIN (Washington, University, Seattle), and BAHMAN NAMDAR (Boeing Commercial Airplane Group, Seattle, WA) AIAA,

SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3179) Copyright

BUWICE is a user friendly, X-Window based software package written for ice accretion predictions on airfoils and axisymmetric engine inlets. The purpose of this paper is to demonstrate an application of a graphical user interface (GUI) that makes a complicated engineering application user friendly and to show its application to generic engine inlets. The GUI allows the user to control the flow of the program via pull-down menus, dialog boxes and push bottons. The code modules required in an icing prediction include a Navier-Stokes flow solver, an icing trajectory analysis code, an icing thermodynamics module, and, finally, an icing accretion module. Despite the complexity of each module, BUWICE retains the simplicity of a PC or MacIntosh application with its look-and-feel interface. The details of the program are discussed and several validation runs are demonstrated. Some specific, detailed data obtained from the code cannot be presented here due to the proprietary nature of the results.

A92-48802#

DYNAMIC TURBINE ENGINE COMPRESSOR CODE (DYNTECC) - THEORY AND CAPABILITIES

A. A. HALE and M. W. DAVIS (Sverdrup Technology, Inc., Arnold AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 12 p. Research supported by USAF. refs (AIAA PAPER 92-3190)

The capabilities of DYNTECC, a one-dimensional stage-by-stage axial compression mathematical model, are reviewed. The code uses a finite difference technique to simultaneously solve the mass, momentum, and energy equations with turbomachinery source terms (e.g., mass bleed, blade forces, and shaft work); the source terms are determined from a complete set of stage characteristics. DYNTECC has the capability to analyze the post-stall behavior as well as predict the onset of system instability. The analysis capabilities of DYNTECC are illustrated for various applications.

V.L.

A92-48903#

DERIVATION OF ABCD SYSTEM MATRICES FROM **NONLINEAR DYNAMIC SIMULATION OF JET ENGINES**

NANAHISA SUGIYAMA (National Aerospace Laboratory, Chofu, Japan) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 9 p. refs (AIAA PAPER 92-3319) Copyright

A method is presented for deriving a linearized plant model in the form of ABCD system matrices from a nonlinear dynamic simulation. To illustrate the capabilities of the software developed here, ABCD matrices of a two-spool turbofan engine are obtained and compared against actual engine data. The sensitivity to perturbation and the formula used, the linearity of state derivatives, and model uncertainty are discussed. In the example, reasonable results are obtained with 2-percent perturbation and a three-point Lagrange formula.

A92-48910#

EXPERT SYSTEMS FOR THE TROUBLE-SHOOTING AND THE **DIAGNOSTICS OF ENGINES**

GIOVANNI TORELLA (Accademia Aeronautica, Pozzuoli, Italy) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 13 p. refs (AIAA PAPER 92-3327) Copyright

A study was conducted to assess the possibility of developing expert systems for the trouble-shooting and diagnostics of both reciprocating and gas turbine engines. It is shown that the necessary information for constructing knowledge bases can be obtained from overhaul manuals or direct experience accumulated during the engine service life. For diagnostics, suitable knowledge bases can be built using engine simulation codes. Expert systems can be created using both procedural and declarative languages, with emphasis on full interaction with the user. Applications of

expert systems for the trouble-shooting and diagnostics of engines are discussed.

N92-28245# Naval Postgraduate School, Monterey, CA. NPSNET: FLIGHT SIMULATION DYNAMIC MODELING USING QUATERNIONS M.S. Thesis

JOSEPH M. COOKE Mar. 1992 62 p (AD-A247484) Avail: CASI HC A04/MF A01

The Naval Postgraduate School (NPS) has actively explored design and implementation of networked, realtime, three-dimensional battlefield simulations on low cost, commercially available graphics workstations. The most recent system, NPSNET, has improved in functionality to such an extent, that it is considered a low cost version of the Defense Advanced Research Project Agency's (DARPA) SIMNET system. In order to reach that level, it was necessary to economize in certain areas of the code so that real-time performance occurred at an acceptable level. One of those areas was in aircraft dynamics. However, with 'off-the-shelf' computers becoming faster and cheaper, real-time and realistic dynamics are no longer an expensive option. The realistic behavior can now be enhanced through the incorporation of an aerodynamic model. To accomplish this task, a prototype flight simulator was built that is capable of simulating numerous types of aircraft simultaneously within a virtual world. Beside being easily incorporated into NPSNET, such a simulator will also provide the base functionality for the creation of a general purpose aerodynamic simulator that is particularly useful to aerodynamic students for graphically analyzing differing aircraft's stability and control characteristics. This system is designed for use on a Silicon Graphics workstation and uses the GL libraries.

N92-28581# Technische Univ., Delft (Netherlands). Faculty of

Aerospace Engineering. INVERSE CONTROL PROBLEMS: MATHEMATICAL PRELIMINARIES, SYSTEM THEORETICAL APPROACHES, AND THEIR APPLICATIONS TO AIRCRAFT DYNAMICS

E. S. L. H. WIRYOHADIATMOJO Oct. 1991 160 p (LR-665; ETN-92-91403) Avail: CASI HC A08/MF A02

The concept of inverse control problems in multivariable systems is to determine the characteristics of unknown inputs when the characteristics of outputs are known a priori or prescribed. An attempt to provide systematically the necessary mathematical models to describe such problems is reported. By adopting the system theoretical approach, system inverses are constructed using transfer function and state space methods to study the behavior of the dynamics of such systems. The unknown inputs are found to be the outputs of these inverses. Additionally necessary and sufficient conditions for a class of reproducible outputs and for system invertibility are derived.

N92-28635# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

HYPERBOLIC GRID GENERATION WITH BEM SOURCE

14 p M. H. L. HOUNJET 9 Oct. 1990 Presented at the International Association for Boundary Element Methods, Rome, Italy, 15-19 Oct. 1990

(Contract NIVR-01904-N)

(NLR-TP-90334-U; ETN-92-91448) Avail: CASI HC A03/MF A01

A method for the generation of O type grids about transverse cross sections of transport type aircraft is presented. The method combined a hyperbolic grid generation scheme with source terms obtained with a Boundary Element Method (BEM) in such a way that O type grids around fairly complex shapes with concavities can be generated easily. The component of the method, a boundary element method, a method to generate grids with a boundary element method, and the hyperbolic grid generation scheme are described, and applications are shown.

N92-29188# Mei Associates, Inc., Lexington, MA. DESIGN SPECIFICATIONS FOR THE ADVANCED INSTRUCTIONAL DESIGN ADVISOR (AIDA), VOLUME 2 Final Report, Aug. 1989 - Jul. 1991

ALBERT E. HICKEY, J. MICHAEL SPECTOR, and DANIEL J. MURAIDA Jan. 1992 132 p (Contract F33615-88-C-0003) (AD-A248202; AL-TR-1991-0085-VOL-2) Avail: CASI HC A07/MF A02

This is the final report for the second phase effort or the Advanced Instructional Design Advisor (AIDA) project. An experimental system called XAIDA is described. The proposed XAIDA is intended to assist subject-matter experts in the design and development of computer-based instructional materials. The functional requirements for an automated and intelligent advisor that would be appropriate for Air Force technical development are presented, along with a system specification, automated instruction, instructional development, computer-based instruction, interactive technology, courseware design. At the request of the 857th Strategic Hospital Bioenvironmental Engineering Services the Armstrong Laboratory Occupational and Environmental Health Directorate (AL/OE) conducted a Hazardous Waste Technical Assistance Survey at Minot AFB on 24-28 Jun. 1991. The scope of this survey was to address hazardous waste management practices, to explore opportunities for waste minimization, and to determine waste streams. The survey team performed a shop-by-shop determination of hazardous waste streams and met with hazardous waste managers to discuss their waste programs. Recommendations include: (1) employ proven waste reduction techniques in 857 TRANS shops, 857 CES vehicle maintenance and equipment maintenance shops, and 5 FMS aircraft maintenance shops; and (2) install locking devices on each accumulation drum or tank at accumulation points. GRA

N92-29604# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

HYPERBOLIC GRID GENERATION CONTROL BY PANEL METHODS

M. H. L. HOUNJET 15 Feb. 1991 17 p Presented at the 3rd International Conference on Numerical Grid Generation in Computational Fluid Dynamics and Related Fields, Barcelona, Spain, 3-7 Jun. 1991

(Contract NIVR-01904-N)

(NLR-TP-91061-U; ETN-92-91453) Avail: CASI HC A03/MF A01 A method for the generation of OH type grids about transport type aircraft is presented. The method combines a hyperbolic grid generation scheme with source terms obtained with a panel method in such a way that OH type grids around fairly complex shapes with concavities can be generated easily. The components of the method, a method to generate grids with a panel method and the hyperbolic grid generation scheme, are described and applications are shown.

N92-30207*# Toledo Univ., OH. USERS MANUAL FOR UPDATED COMPUTER CODE FOR AXIAL-FLOW COMPRESSOR CONCEPTUAL DESIGN Final Report

ARTHUR J. GLASSMAN Jul. 1992 23 p (Contract NAG3-1165; RTOP 505-69-50) (NASA-CR-189171; E-7003; NAS 1.26:189171) Avail: CASI HC A03/MF A01

An existing computer code that determines the flow path for an axial-flow compressor either for a given number of stages or for a given overall pressure ratio was modified for use in air-breathing engine conceptual design studies. This code uses a rapid approximate design methodology that is based on isentropic simple radial equilibrium. Calculations are performed at constant-span-fraction locations from tip to hub. Energy addition per stage is controlled by specifying the maximum allowable values for several aerodynamic design parameters. New modeling was introduced to the code to overcome perceived limitations. Specific changes included variable rather than constant tip radius, flow path inclination added to the continuity equation, input of mass flow rate directly rather than indirectly as inlet axial velocity, solution for the exact value of overall pressure ratio rather than for any value that met or exceeded it, and internal computation of efficiency rather than the use of input values. The modified code was shown

to be capable of computing efficiencies that are compatible with those of five multistage compressors and one fan that were tested experimentally. This report serves as a users manual for the revised code, Compressor Spanline Analysis (CSPAN). The modeling modifications, including two internal loss correlations, are presented. Program input and output are described. A sample case for a multistage compressor is included.

16

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.

A92-45831* National Aeronautics and Space Administration.
Langley Research Center, Hampton, VA.
HIGH-SPEED PROPERTIES NOISE PREDICTION A

HIGH-SPEED PROPELLER NOISE PREDICTION - A MULTIDISCIPLINARY APPROACH

MARK H. DUNN (Lockheed Engineering and Sciences Co., Hampton, VA) and F. FARASSAT (NASA, Langley Research Center, Hampton, VA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1716-1723. Previously cited in issue 02, p. 228, Accession no. A91-12450. refs Copyright

A92-45835* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

RELATIONSHIP BETWEEN THE INSTABILITY WAVES AND NOISE OF HIGH-SPEED JETS

CHRISTOPHER K. W. TAM, PING CHEN (Florida State University, Tallahassee), and J. M. SEINER (NASA, Langley Research Center, Hampton, VA) AIAA Journal (ISSN 0001-1452), vol. 30, no. 7, July 1992, p. 1747-1752. Previously cited in issue 06, p. 922, Accession no. A91-19328. refs (Contract NAG1-421) Copyright

A92-45876

INTERNATIONAL CONGRESS ON RECENT DEVELOPMENTS IN AIR- AND STRUCTURE-BORNE SOUND AND VIBRATION, AUBURN UNIVERSITY, AL, MAR. 6-8, 1990, PROCEEDINGS. VOLS. 1 & 2

MALCOLM J. CROCKER, ED. (Auburn University, AL) Congress sponsored by Auburn University, IUPAP, NSF, et al. Auburn, AL, Auburn University, 1990, p. Vol. 1, 510 p.; vol. 2, 477 p. For individual items see A92-45877 to A92-45934. Copyright

Various papers on recent developments in air- and structure-borne sound and vibration are presented. The general topics addressed include: sound intensity, sound radiation and acoustic coupling, modal analysis and synthesis, acoustics, active vibration control, diagnostics and condition monitoring, finite element analysis, structural intensity and acoustical holography, passive vibration damping, boundary element methods, active noise and vibration control, material characterization and NDE, active noise and vibration control, sound radiation and scattering, statistical energy analysis, vibration and dynamics.

A92-45879

NEW METHODS TO DETERMINE THE TRANSMISSION LOSS OF PARTITIONS USING SOUND INTENSITY MEASUREMENTS ZDENEK VALC (Zetor Co., Brno, Czechoslovakia) and MALCOLM J. CROCKER (Auburn University, AL) IN: International Congress on Recent Developments in Air- and Structure-Borne Sound and Vibration, Auburn, AL, Mar. 6-8, 1990, Proceedings. Vol. 1. Auburn, AL, Auburn University, 1990, p. 57-64. refs

Some new approaches to determining sound transmission loss

due to partitions are described. These approaches include: (1) the determination of the incident sound intensity with an intensity probe by placing highly absorbing material on the source side of the partition; (2) the determination of the incident sound intensity in the window of the source room using an intensity probe or alternatively, in the case of an aerospace structure, determining the intensity with the structural panel removed; and (3) the determination of the incident intensity from the surface-averaged sound pressure level in a reverberant source room. Preliminary measurements show that placing sound-absorbing material on the source side of the panel enables the incident intensity to be obtained accurately in the frequency range of about 700 to 10,000 Hz.

A92-45921

THE RELATIONSHIP BETWEEN MODE LOCALIZATION AND ENERGY TRANSMISSION PARAMETERS IN THE VIBRATION OF COUPLED STRUCTURES

JAMES A. MOORE and VENKATASAM ESWARA (Lowell, University, MA) IN: International Congress on Recent Developments in Air- and Structure-Borne Sound and Vibration, Auburn, AL, Mar. 6-8, 1990, Proceedings. Vol. 2. Auburn, AL, Auburn University, 1990, p. 787-792. refs

Discontinuities in structures block vibratory energy transmission as characterized by a transmission coefficient and in an SEA model by the coupling loss factor. Weak coupling across a discontinuity results in 'local' structural modes of the entire system with the response localized on either side of the discontinuity. For simple 1-D string and beam systems, ratios of the modal response in local regions compare quantitatively with transmission coefficient values and possibly the SEA coupling loss factor. This result may aid in the initial selection of SEA subsystems. Estimates of response variance may be reduce if the SEA subsystems correspond to the regions of localized modal response. Transmission coefficient values at discontinuities in complex structures may serve to identify regions of localized response in selecting SEA subsystems.

Author

A92-45929

SOLUTIONS OF ACOUSTIC FIELD PROBLEMS USING PARALLEL COMPUTERS

M. ZUBAIR, U. S. SHIRAHATTI, T. L. JACKSON, and C. E. GROSCH (Old Dominion University, Norfolk, VA) IN: International Congress on Recent Developments in Air- and Structure-Borne Sound and Vibration, Auburn, AL, Mar. 6-8, 1990, Proceedings. Vol. 2. Auburn, AL, Auburn University, 1990, p. 903-908. refs Copyright

An effort is made to solve large scale acoustic field problems on such parallel computers as the DAP-510 and the NCUBE-7. After deriving both the mean flow equations for an inviscid moving medium and the acoustic fluctuations associated with them, Euler equations are solved by a compact four-step, fourth-order Runge-Kutta scheme, for efficiency and ease of implementation.

O.C.

A92-46248

INTEGRATED OPTIC COMPONENTS FOR ADVANCED TURBINE ENGINE CONTROL SYSTEMS

S. M. EMO, T. R. KINNEY (Allied-Signal Aerospace Co., Bendix Engine Controls Div., South Bend, IN), and KA-KHA WONG (Allied-Signal, Inc., Morristown, NJ) IN: Integrated optics and optoelectronics II; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990. Bellingham, WA, Society of Photo-Optical Instrumentation Engineers, 1991, p. 266-276.

The status of present optic technology in turbine engine control is highlighted, and future developments and trends are explored. Attention is given to a base engine control system configured with a primary and backup or standby control. Specific needs for integrated optic components in advanced turbine engine control systems are addressed. The optic harness and interconnect, as well as the electrooptic interface involving only coupling optic

excitation and return signals are discussed. A number of 1:2 and 1:5 power splitters and combiners being fabricated using the ion-exchange technology on glass substrates are shown. The devices are potentially useful for the combination of various optical signals from a number of sensor units, and in addition calibration signals could be added prior to signal processing. Integrated optic and electrooptic interfaces are expected to evolve into the engine control environment. A concept for a multiple electrooptic module which contains a single or multiple optic layers within the printed wiring card is illustrated.

A92-46430

ENERGY ANALYSIS OF HIGH-SPEED FLIGHT SYSTEMS

P. CZYSZ (McDonnell Douglas Corp., Saint Louis, MO) and S. N. B. MURTHY (Purdue University, West Lafayette, IN) IN: High-speed flight propulsion systems. Washington, DC, American Institute of Aeronautics and Astronautics, Inc., 1991, p. 143-235. Research supported by McDonnell Douglas Corp. refs Copyright

Methods of energy analysis applicable to high-speed flight propulsion systems are described and illustrated, and the interrelations in the analysis of the trajectory, energy utilization, and weights are delineated. Energy analysis is shown to have a central role in flight vehicle optimization. The geography of launch and recovery site and the weight fractions are taken into consideration. A methodology for optimizing propulsion for a given flight vehicle system is outlined.

A92-46799* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

NOISE OF TWO HIGH-SPEED MODEL COUNTER-ROTATION PROPELLERS AT TAKEOFF/APPROACH CONDITIONS

RICHARD P. WOODWARD (NASA, Lewis Research Center, Cleveland, OH) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 679-685. refs Copyright

This paper presents acoustic results for two model counter-rotation propellers which were tested in the NASA Lewis 9- x 15-ft Anechoic Wind Tunnel. The propellers had a common forward rotor, but the diameter of the aft rotor of the second propeller was reduced in an effort to reduce its interaction with the forward rotor tip vortex. The propellers were tested at Mach 0.20, which is representative of takeoff/approach operation. Acoustic results are presented for these propellers which show the effect of rotor spacing, reduced aft rotor diameter, operation at angle-of-attack, blade loading, and blade number. Limited aerodynamic results are also presented to establish the propeller operating conditions.

A92-46809

SUPPRESSION OF FATIGUE-INDUCING CAVITY ACOUSTIC MODES IN TURBOFAN ENGINES

ROBERT H. BENNER (Rohr, Inc., Chula Vista, CA) Journal of Aircraft (ISSN 0021-8669), vol. 29, no. 4, July-Aug. 1992, p. 718-720. Previously cited in issue 02, p. 229, Accession no. A91-12457. refs
Copyright

A92-47028#

HYPERSONIC PLASMA PREDICTIONS AT NONZERO ANGLE OF ATTACK

M. OLMOS, S. F. SATERLIE, L. GLATT (TRW Space and Defense Sector, San Bernardino, CA), S. HOWARD, K. GOLDEN, T. HANRAHAN (XonTech, Los Angeles, CA), and J. KRIEBEL (USAF, Ballistic Missile Organization, Norton AFB, CA) AIAA, Plasmadynamics and Lasers Conference, 23rd, Nashville, TN, July 6-8, 1992. 7 p. refs

(Contract F04704-92-C-0006)

(AIAA PAPER 92-3027)

Under various conditions encountered by a hypersonic-cruise aircraft over the course of its trajectory, levels of ionization may be encountered which could degrade the performance of guidance sensors such as radar and satellite global positioning. An effort is

presently made to furnish predictions for the nonequilibrium chemically-reacting ionized flows generated by a hypersonic vehicle at small angle of attack. A comparison of these predictions with flight data shows good agreement with the vehicle's windward side; the leeward side predictions are, however, excessive. An analysis of these results shows possible areas of improvement in computational methodology.

A92-48500

OPTICS IN AIRCRAFT ENGINES

JAMES VACHON and SUBHASH MALHOTRA (GE Aircraft Engines, Cincinnati, OH) IN: NAECON 91: Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 2. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 585-590. Copyright

The authors describe optical IR&D (independent research and development) programs designed to demonstrate and evaluate optical technologies for incorporation into next-generation military and commercial aircraft engines. Using a comprehensive demonstration program to validate this technology in an on-engine environment, problems encountered can be resolved early and risk can be minimized. In addition to specific activities related to the optics demonstration on the fighter engine, there are other optical programs underway, including a solenoid control system, a light off detection system, and an optical communication link. Research is also underway in simplifying opto-electronics and exploiting multiplexing to further reduce cost and weight.

A92-48597

BASIC EXPERIMENTS ON THE DIRECTIVITY OF THE SOUND RADIATION EMITTED BY A TURBOSHAFT ENGINE EXPERIENCES DE BASE SUR LA DIRECTIVITE DU RAYONNEMENT SONORE EMIS PAR UN TURBOMOTEUR]

C. POLACSEK (ONERA, Chatillon, France) (Congres Francais d'Acoustique, 2nd, Arcachon, France, Apr. 14-16, 1992) ONERA, TP no. 1992-36, 1992, 5 p. In French. refs (ONERA, TP NO. 1992-36)

Basic acoustic experiments have been performed in an anechoic chamber in order to analyze the influence of the geometry of a turboshaft engine air intake on sound propagation and radiation. Two air intake models have been studied. The compressor noise is simulated by a spinning mode synthesizer. Modal analysis and experimental directivities are compared to some calculations.

Author

A92-48601

INFLUENCE OF GEOMETRICAL PARAMETERS ON HELICOPTER ROTOR HIGH SPEED IMPULSIVE NOISE

J. PRIEUR and C. POLACSEK (ONERA, Chatillon, France) (DGLR and AIAA, Aeroacoustics Conference, 14th, Aachen, Federal Republic of Germany, May 11-14, 1992) ONERA, TP no. 1992-40, 1992, 10 p. refs (ONERA, TP NO. 1992-40)

The radiation of impulsive noise from helicopter rotors in high speed forward flight, as well as global performance, is largely influenced by blade geometry. A review of theoretical effort in this field and examples mainly taken from ONERA experimental wind tunnel studies are presented. The benefit in terms of noise reduction, provided by an advanced geometry, is assessed and compared to what is obtained by lowering the rotation speed. Wind tunnel acoustic studies also show that the designs of low noise blade geometries either for descent flight, or for high speed are not inevitably antithetical.

ACOUSTIC SPINNING-MODE ANALYSIS BY ITERATIVE THRESHOLD METHOD APPLIED TO A HELICOPTER TURBOSHAFT ENGINE

D. BLACODON (ONERA, Chatillon, France) (DGLR and AIAA, Aeroacoustics Conference, 14th, Aachen, Federal Republic of Germany, May 11-14, 1992) ONERA, TP no. 1992-41, 1992, 11 p. Research supported by Ministere de la Defense and Turbomeca (ONERA, TP NO. 1992-41)

Spinning-mode analysis methods are commonly used to study the space-structure of the acoustic field inside ducts. In some applications, the acoustic field is very noisy. The acoustic modes may then be overwhelmed by the spurious modes in the modal spectra. The problem may be solved by methods which greatly reduce the background noise. Four methods studied in a previous work are briefly reminded in this paper. The method which provides the best reduction of the background noise may be inaccurate in certain cases. Indeed, it does not correctly predict the amplitudes of all the acoustic spinning modes. An iterative threshold technique is proposed to eliminate this drawback. It is compared to the four other methods by numerical simulations and by tests in a nozzle of a Turbomeca TM333 turboshaft engine.

A92-48618

RESEARCH AND STUDIES ON QUIET HELICOPTERS [ETUDES ET RECHERCHES EN MATIERE D'HELICOPTERES SILENCIEUX1

HENRI-JAMES MARZE (Eurocopter France, Marignane) and SERGE LEWY (ONERA, Chatillon, France) (Entretiens Science et Defense, La Villette, France, May 12, 13, 1992) ONERA, TP no. 1992-59, 1992, 18 p. In French, Research supported by DRET and Service Technique des Programmes Aeronautiques. refs (ONERA, TP NO. 1992-59)

Various issues associated with the search for guiet helicopters are presented and a midterm research program started in 1991 is described. The flight regimes to be investigated first are high-speed flight and approach, as the main rotor generates a very characteristic loud and impulsive noise at that time. The prediction methods, the techniques of noise reduction, and the goals to be achieved are reviewed.

N92-28292# Army Construction Engineering Research Lab., Champaign, IL.

OPERATIONAL NOISE DATA FOR OH-58D ARMY HELICOPTERS Final Report

L. J. BENSON, MICHEAL J. WHITE, and KEVIN J. MURPHY Jan.

(AD-A246822; CERL-N-92/07) Avail: CASI HC A04/MF A01

The Army needs helicopter noise source emission data for use in the Installation Compatible Use Zone (ICUZ) program and for environmental assessments. This research gathered noise source emission data for the OH-58D helicopter. The data were normalized to 250 ft for use in noise maps. The data were also used to develop sound exposure level (SEL) versus distance curves for comparison with other helicopter data. The data show that the A-weighted maximum noise level increases with airspeed for level flight, but the A weighted SEL increases only slightly. The highest A-weighted maximum level was produced by the out-of-ground effect hover. Landings produce the largest A-weighted SEL.

GRA

N92-28302# Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.

PASSIVE ACOUSTIC RANGE ESTIMATION OF HELICOPTERS **Final Report**

REO OLSON and DANIEL H. CRESS Feb. 1992 80 p (AD-A248033; WES/TR/EL-92-13) Avail: CASI HC A05/MF A01

A passive acoustic method is presented that determines the velocity of a moving helicopter and its range at the closest point of approach. This method requires only the use of a single microphone if the fundamental blade rotation frequency of the helicopter is known, or two spatially separated microphones if it is not. The blade rotation frequency is generally adequately known after the helicopter is correctly classified using acoustic signature characteristics other than those discussed herein. The range estimate is considered valid for ranges of a few hundred meters with the attendant assumptions that: (1) the helicopter is traveling in a straight line, (2) the helicopter is moving at a constant velocity,

and (3) the main rotor of the helicopter has a stable revolution rate typical of present operational helicopters. The technique was successfully tested on an example helicopter.

N92-28556*# McDonnell-Douglas Corp., Long Beach, CA. EVALUATION OF OUTDOOR-TO-INDOOR RESPONSE TO MINIMIZED SONIC BOOMS

DAVID BROWN and LOUIS C. SUTHERLAND Jun. 1992 42 p Presented at the First Annual High-Speed Research Workshop, Williamsburg, VA, 14-16 May 1991 Prepared in cooperation with Wyle Labs., Inc., El Segundo, CA

(Contract NAS1-19060; RTOP 537-03-21-03)

(NASA-CR-189643; NAS 1.26:189643; WYLE-TN-91-8) Avail: CASI HC A03/MF A01

Various studies were conducted by NASA and others on the practical limitations of sonic boom signature shaping/minimization for the High-Speed Civil Transport (HSCT) and on the effects of these shaped boom signatures on perceived loudness. This current effort is a further part of this research with emphasis on examining shaped boom signatures which are representative of the most recent investigations of practical limitations on sonic boom minimization, and on examining and comparing the expected response to these signatures when experienced indoors and outdoors.

Author

N92-28695# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.

EXPERIMENTAL VALIDATION OF A LINE-DUCT ACOUSTICS MODEL INCLUDING FLOW

E. R. RADEMAKER 25 Jun. 1990 14 p Presented at ASME Conference on Duct Acoustics, Dallas, TX, Nov. 1990 (Contract NIVR-01803-N)

(NLR-TP-90223-U; ETN-92-91541) Avail: CASI HC A03/MF A01

In the spinning mode synthesizer which was coupled to the flow nozzle of the small anechoic wind tunnel, an experimental program for the validation of a theoretical duct acoustics model was carried out. This model, LINDA, calculates the sound propagation in a cylindrical flow duct of finite length, which includes an acoustically lined section between two hard walled sections. Measurements of the circumferential and radial acoustic pressure distribution downstream and upstream of the lined sections, and of the radial distribution halfway of a lined section were made with flow at several frequencies and acoustic mode adjustments. From these measurements, quantities which characterize the net damping attained by the liners (the insertion loss and transmission loss) were derived. These values and the radial distribution of the transmitted field are compared with the theoretical results. The agreeement is good (plus or minus 1dB).

N92-28909*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

THE DESIGN OF TEST-SECTION INSERTS FOR HIGHER SPEED AEROACOUSTIC TESTING IN THE AMES 80- BY 120-FOOT WIND TUNNEL

PAUL T. SODERMAN and LARRY E. OLSON Jan. 1992 13 p Proposed for presentation at the DGLR/AIAA 14th Aeroacoustics Conference, Aachen, Germany, 11-14 May 1992 (Contract RTOP 505-59-52)

(NASA-TM-103915; A-92052; NAS 1.15:103915) Avail: CASI HC A03/MF A01

An engineering feasibility study was made of aeroacoustic inserts designed for large-scale acoustic research on aircraft models in the 80- by 120-Foot Wind Tunnel at NASA Ames Research Center. The goal was to find test-section modifications that would allow improved aeroacoustic testing at airspeeds equal to and above the current 100 knots limit. Results indicate that the required maximum airspeed drives the design of a particular insert. Using goals of 200, 150, and 100 knots airspeed, the analysis let to a 30 x 60 ft open-jet test section, a 40 x 80 ft open-jet test section, and a 70 x 110 ft closed test section with enhanced wall lining respectively. The open-jet inserts would be composed of a nozzle, collector, diffuser, and acoustic wedges incorporated in the existing 80 x 120 ft test section. The closed test section

would be composed of approximately 5-ft acoustic wedges covered by a porous plate attached to the test-section walls of the existing 80 x 120. All designs would require a double row of acoustic vanes between the test section and fan drive to attenuate fan noise and, in the case of the open-jet designs, to control flow separation at the diffuser downstream end. The inserts would allow virtually anechoic acoustics studies of large helicopter models, jets, and V/STOL aircraft models in simulated flight. Model scale studies would be necessary to optimize the aerodynamic and acoustic performance of any of the designs. Successful development of acoustically transparent walls, though not strictly necessary to the project, would lead to a porous-wall test section that could be substituted for any of the open-jet designs, and thereby eliminate many aerodynamic and acoustic problems characteristic of open-jet shear layers. Author

N92-28923# United Kingdom Atomic Energy Authority, Harwell (England).

REPORT ON THE WORKSHOP ON ION IMPLANTATION AND ION BEAM ASSISTED DEPOSITION

G. DEARNALEY Mar. 1992 3 p Workshop held in Corpus Christi, TX, 9-11 Mar. 1992

(AD-A250561; R/D-6907-EE-06) Avail: CASI HC A01/MF A01

This workshop was organized by the Corpus Christi Army Depot (CCAD), the major helicopter repair base within AVSCOM. Previous meetings had revealed a strong interest throughout DoD in ion beam technology as a means of extending the service life of military systems by reducing wear, corrosion, fatigue, etc. The workshop opened with an account by Dr. Bruce Sartwell of the successful application of ion implantation to bearings and gears at NRL, and the checkered history of the MANTECH Project a Spire Corporation. Dr. James Hirvonen (AMTL) continued with a summary of successful applications to reduce wear in biomedical components, and he also described the processes of ion beam-assisted deposition (IBAD) for a variety of protective coatings, including diamond-like carbon (DLC).

N92-29095# Department of the Navy, Washington, DC. MULTI-CHANNEL FIBER OPTIC ROTARY JOINT FOR SINGLE-MODE FIBER Patent Application

GREGORY H. AMES, inventor (to Navy) 16 Sep. 1991 21 p (AD-D015273; US-PATENT-APPL-SN-760635) Avail: CASI HC A03/MF A01

A fiber optic rotary joint device is described. The device includes a rotor connected to either an input or output fiber optic array and a stator connected to the remaining unconnected input or output fiber optic array. A prism is mounted within the rotor for derotating an image of the input array to allow coupling to the output array. A prism rotor and a gear system are provided for rotating the prism at half the speed of the rotor. Optical means are provided for two adjustment tiers (small angular adjustment and fine adjustment) of alignment of the light propagation path for each channel of the array. Mechanical structural features provide maintenance of accurate alignment of optical elements under rotation of the joint. Further mechanical structural features provide resiliency of the gear system to isolate its operation from maintenance of mechanical alignment of optical elements. GRA

N92-29201# Cambridge Univ. (England). Dept. of Engineering. BOUNDARY LAYER INDUCED NOISE IN AIRCRAFT W. R. GRAHAM May 1992 345 p

(ISSN 0309-7293)

(CUED/A-AERO/TR-18) Avail: CASI HC A15/MF A03

The aim of this research is to investigate ways of controlling boundary layer induced noise at the design stage, as the problem is much harder to treat after it has become apparent. In order to achieve this, it is essential to be able to model the noise generation process successfully, preferably in such a way that our physicial understanding of the problem is enhanced, since without this understanding the formulation of general design guidelines is almost impossible. At present, although a large body of research germane to the problem exists, there is no such model, and the development of one is, thus, the first requirement of this work. Once the model

is complete and validated, the question of noise limitation may be addressed. The reduction of the boundary layer induced noise problem in aircraft to an initial model problem, which may be formulated in general terms, and the subsequent further approximations that may be made to achieve a form simple enough to facilitate understanding of the results while retaining the necessary features of the problem are described. Author

N92-29997# Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Abteilung Technische Akustik.

JET AIRCRAFT NOISE AT HIGH SUBSONIC FLIGHT MACH NUMBERS [DER LAERM VON STRAHLFLUGZEUGEN BEI HOHEN UNTERSCHALL-FLUGMACHZAHLEN]

JAN BOETTCHER and ULF MICHEL Aug. 1991 94 p In GEORGIAN

(ISSN 0939-2963)

(DLR-FB-91-28; ÉTN-92-91733) Avail: CASI HC A05/MF A01; DLR, Wissenschaftlisches Berichtswesen, Postfach 90 60 58, 5000 Cologne, Fed. Republic of Germany, HC

Acoustic overfly measurements are carried out and analyzed to identify the sound sources of the noise development by means of their spectral radiation properties. The extension of existing prediction schemes for the radiation mixing and the broadband shock noise is discussed on the basis of experimental results. Measure and calculation results were compared and a good agreement was found for the time profiles of noise levels, the frequency spectra, and the total sound pressure level as a function of emission angle. The prediction schema could be used to demonstrate the influence of operational parameters and quantify the noise production. It is shown that a decrease in flight Mach number and an increase of flight height cause an important noise reduction.

17

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

A92-44994

THE DEVELOPMENT OF AN INTELLIGENT HUMAN FACTORS DATA BASE AS AN AID FOR THE INVESTIGATION OF AIRCRAFT ACCIDENTS

AMANDA J. W. FEGGETTER (Ministry of Defence, London, England) IN: International Symposium on Aviation Psychology, 6th, Columbus, OH, Apr. 29-May 2, 1991, Proceedings. Vol. 2. Columbus, OH, Ohio State University, 1991, p. 624-629. refs

A human factors data aid encompassing psychological, physiological, sociological, and ergonomic considerations has been developed for use in the investigation of aircraft accidents. This data base incorporates intelligence in the form of stored rules and prior knowledge, collectively constituting a comprehensive list of contributory factors; after covering a given incident in detail, the aid allows all relevant data to be organized in the form of a draft standardized report. The system also facilitates the reexamination of suspected causative factors.

A92-45581#

APPLIED AERODYNAMICS EDUCATION - DESIGN AND

CONRAD F. NEWBERRY (U.S. Naval Postgraduate School, Monterey, CA) AIAA, Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992. 10 p. refs (AIAA PAPER 92-2662)

The paper defines design and its role in engineering science classes in general and in aerodynamics classes in particular. The

need and purpose for design in the engineering curriculum is treated in some detail. ABET design requirements are discussed in terms of accreditation criteria and as suggestions generally for incorporating design into engineering science classes. Some attention is given to how design type problems can enhance the learning of theoretical aerodynamics. There is a detailed discussion of the seven (7) ABET defined facets of design as they might be implemented in a typical undergraduate aerodynamics class. It is concluded that a design component in a typical aerodynamics class in engineering science is not only necessary, it is desirable and can be achieved with a minimal impact upon the science content of the course.

A92-47628

MASSINFO - AN INTELLIGENT MASS PROPERTIES INFORMATION SYSTEM

STEVEN R. WELCH (Boeing Defense & Space Group, Military Airplanes Div., Seattle, WA) Weight Engineering (ISSN 0583-9270), vol. 51, no. 3, Spring 1992, p. 7-18.

MassInfo is a Macintosh program that uses an intuitive interface and built-in intelligence features to keep track of component weights, cgs, inertia, material distribution, weight recording quality, etc., for all types of vehicles. It is capable of handling multiple vehicle effectivities using relational data structures, multiple users with various administrative privileges and preferences, and multiple coordinate systems having offsets and rotations. Hierarchical trees (functional code, drawing, work breakdown structure, and three others optionally defined by the user) can be used to report mass properties. Several common report formats (such as Mil-Std-1374 and Mil-Std-38310B) can be easily generated, as well as custom user reports. Import and export features allow data exchange with other database systems or workstation applications. The paper illustrates the program's features through a sample session.

A.F.S.

A92-48555

USING DESIGN OF EXPERIMENTS TO IMPROVE PRODUCT AND PROCESS INTEGRITY

LLOYD CONDRA (Eldec Corp., Lynnwood, WA) and MICHELLE LINDSLEY (Washington, University, Seattle) IN: NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991. Vol. 3. New York, Institute of Electrical and Electronics Engineers, Inc., 1991, p. 1008-1011. refs

The authors summarize the needs and benefits of DoE (design of experiments) in avionics markets, provide a brief discussion of DoE methods, and present a formalism for using DoE in reliability determination and assurance. DoE is being used to produce dramatic improvements in the following areas of avionics manufacturing: process optimization/improvement; product design/improvement; new process development; capital equipment acquisition; quick response to RFPs; and improved communication. It is concluded that DoE is an efficient way to systematically obtain knowledge, and is therefore a valuable tool in an industry in which short cycle times, low costs, and high reliability must be demonstrated.

A92-49117#

ENGINE AIRCRAFT SYSTEMS INTEGRATION COURSE

PAUL J. HESS (GE Aircraft Engines, Cincinnati, OH) AIAA, SAE, ASME, and ASEE, Joint Propulsion Conference and Exhibit, 28th, Nashville, TN, July 6-8, 1992. 5 p. refs (AIAA PAPER 92-3762) Copyright

An account is given of a course of study encompassing the numerous considerations involved in aircraft gas turbine system definition within an aerothermodynamic framework; these considerations range over engine cycle type, air flowpath design, control integration, inlet and exhaust integration, acoustics, survivability, reliability, and mechanical subsystems. The integration of these factors is stressed. The systems approach is employed

throughout. Over the years of the course's use, student suggestions have led to a relative deemphasis of the design-related aspects of the subject matter.

O.C.

18

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.

A92-46595

STABILITY AND INHERENT PRECISION OF TWO METHODS FOR SOLVING MOTION AND ABLATION EQUATIONS FOR FIREBALL-FORMING BODIES IN THE EARTH ATMOSPHERE [USTOICHIVOST' I VNUTRENNIAIA TOCHNOST' DVUKH METODOV RESHENIIA URAVNENII DVIZHENIIA I ABLIATSII BOLIDOOBRAZUIUSHCHIKH TEL V ATMOSFERE ZEMLI] V. V. KALENICHENKO (Astronomicheskaia Observatoriia, Kiev, Ukraine) Kinematika i Fizika Nebesnykh Tel (ISSN 0233-7665), vol. 8, no. 3, May-June 1992, p. 69-77. In Russian. refs Copyright

The stability of two methods for solving motion and ablation equations for a fireball-forming body in the earth atmosphere is investigated; the solution's inherent precision is estimated on the basis of the Prairie network catalog. The ratio of the initial and terminal velocities of a fireball on the visible trajectory is shown to be a reliable criterion of the fireball's fitness for determining the physical characteristics of its cosmic body. For the Prairie network, the solution of the motion and ablation equations of a fireball-forming body is stable for those fireballs whose ratio of initial to terminal velocities exceeds 1.7.

19

GENERAL

A92-46201

EMERGING TECHNOLOGY IN THE SOVIET UNION: SELECTED PAPERS WITH ANALYSIS

Falls Church, VA, Delphic Associates, Inc., 1990, 315 p. For individual items see A92-46202 to A92-46204. (ISBN 1-55831-117-1) Copyright

Various papers on emerging Soviet technology are presented. The topics addressed are: economic considerations of emerging technology; aviation, motor, and space designs; new materials and components for IR lasers; electroslag technology for smelting high quality metals from scrap and for preparing ingots with differential properties; computer design and application in the USSR; advances in tribology: slideway design and unloading systems; analysis of emerging Soviet technology. C.D.

N92-28344*# National Aeronautics and Space Administration, Washington, DC.

NASA ENGINEERS AND THE AGE OF APOLLO

SYLVIA DOUGHTY FRIES 1992 232 p (NASA-SP-4104; NAS 1.21:4104; LC-90-39761;

ISBN-0-16-036174-5) Avail: CASI HC A11/MF A03

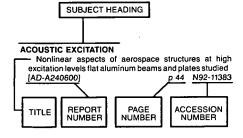
A historical account of NASA's Apollo era engineers is presented. This book is based on interviews that were conducted with fifty-one 'typical' engineers.

N92-29218# Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.). Hauptabteilung Planung DLR RESEARCH REPORTS AND COMMUNICATIONS Annual List, 1990 [JAHRESVERZEICHNIS 1990. DLR-FORSCHUNGSBERICHTE UND DLR-MITTEILUNGEN] W. WOLKE Jul. 1991 41 p In GERMAN (ISSN 0939-2971)

(ETN-92-91391) Avail: CASI HC A03/MF A01

Abstracts on the following are presented: flight mechanics, dynamics of flight systems, flight medicine, air traffic, flow mechanics, aerodynamics, propulsion, chemical propulsion, structural mechanics, aeroelasticity, materials, space simulation, high frequency, optoelectronics, physics, thermodynamics, wind tunnels, applied data technique, and data processing.

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of document content, a title extension is added, separated from the title by three hyphens. The accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence.

A-300	AIRCRAFT	

Ageing airplane repair assessment program for Airbus p 838 N92-30123 A300

A-320 AIRCRAFT

The A320 laminar fin programme [ONERA, TP NO. 1992-23]

p 849 A92-48586 Flight simulation and digital flight controls

p 884 N92-28526

Stability and inherent precision of two methods for solving motion and ablation equations for fireball-forming bodies in the earth atmosphere p 929 A92-46595 Ablation performance characterization of thermal

protection materials using a Mach 4.4 Sled Test [AIAA PAPER 92-3055] p 893 A92-48713

Aerothermal ablation behavior of selected candidate external insulation materials

[AIAA PAPER 92-3056] p 893 A92-48714

ABLATIVE MATERIALS Ablative control

mechanism in nozzle

thermo-protection

p 889 A92-48712

[AIAA PAPER 92-3054] AC GENERATORS

270-Vdc/hybrid 115 Vac electric power generating system technology demonstrator [SAE PAPER 912051] p 861 A92-45435

ACCELERATION (PHYSICS)

Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic

I AIAA PAPER 92-3246 J p 904 A92-48845

ACCEPTABILITY

Validation of simulation systems for aircraft acceptance p 852 N92-28531 testing

ACCESSORIES

An eight month gearbox development program
[AIAA PAPER 92-3368] p 850 A9: p 850 A92-48941

ACCIDENT PREVENTION

Who or what saved the day? A comparison of traditional and glass cockpits p 833 A92-44931 Stop, look and learn from accident investigation

p 834 A92-44996 The effectiveness of training programs for preventing p 834 A92-44997 Organizational factors in human factors accident p 834 A92-45000

ACCOUNTING

MassInfo - An intelligent mass properties information p 928 A92-47628 svstem

ACOUSTIC DUCTS

Experimental validation of a line-duct acoustics model including flow

[NLR-TP-90223-U] p 927 N92-28695

ACOUSTIC EXCITATION

Suppression of fatigue-inducing cavity acoustic modes in turbofan engines
ACOUSTIC FATIGUE p 925 A92-46809

Suppression of fatigue-inducing cavity acoustic modes in turbofan engines p 925 A92-46809 Sonic fatigue analysis and anti-sonic fatigue design of aircraft structure p 848 A92-47666

ACOUSTIC INSTABILITY

Relationship between the instability waves and noise of high-speed jets p 924 A92-45835

ACOUSTIC MEASUREMENT

Experimental validation of a line-duct acoustics model including flow p 927 N92-28695

[NLR-TP-90223-U] ACOUSTIC PROPAGATION

Solutions of acoustic field problems using parallel computers p 925 A92-45929 Basic experiments on the directivity of the sound radiation emitted by a turboshaft engine p 926 A92-48597

[ONERA, TP NO. 1992-36]
ACOUSTIC PROPERTIES

A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465]

ACOUSTICS

p 865 A92-49014 Passive acoustic range estimation of helicopters

IAD-A2480331 p 926 N92-28302 Nonlinear analyses of composite aerospace structures in sonic fatigue [NASA-CR-190565]

ACTIVE CONTROL

p 854 N92-30209

Active control of vortex structures in a separating flow over an airfoil

p 804 A92-45563 [AIAA PAPER 92-2728] International Congress on Recent Developments in Airand Structure-Borne Sound and Vibration, Auburn University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2

p 924 A92-45876 On-line performance evaluation of multiloop digital p 873 A92-46739

Active control of blade vortex interaction

p 814 A92-46944 A new method of helicopter rotor blade motion control p 875 A92-47786

A theoretical study of sensor-actuator schemes for rotating stall control

p 878 A92-49025 1 AIAA PAPER 92-3486 I Integrated Design Analysis and Optimisation of Aircraft

p 851 N92-28469 1AGARD-LS-1861 The use and effectiveness of piloted simulation in transport aircraft research and development p 886 N92-28549

ACTUATORS

Development of the DDV actuation system on the IDF

ISAE PAPER 9120801 p 844 A92-45455 Potential for integrated optical circuits in advanced aircraft with fiber optic control and monitoring systems p 856 A92-46246

Simple fly-by-wire actuator p 876 A92-48491 Variable displacement electro-hydrostatic actuator --- for p 876 A92-48492 flight control systems C-141 and C-130 power-by-wire flight control systems

p 876 A92-48493

Electric actuation system fly-by-wire/power-by-wire control p 877 A92-48494 A theoretical study of sensor-actuator schemes for rotating stall control

[AIAA PAPER 92-3486] p 878 A92-49025 Assessment of valve actuator motor rotor degradation

by Fourier Analysis of current waveform [DE92-013233] p 909 N92-28814 Electromechanical systems with transient high power

response operating from a resonant AC link p 870 N92-28985 INASA-TM-1057161

Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N p 911 N92-30028

ADA (PROGRAMMING LANGUAGE)

Design and implementation of a generic Kalman filter in Ada p 858 A92-48475 Avionics software reusability observations and recommendations p 921 A92-48502

ADAPTIVE CONTROL

Temporal adaptive Euler/Navier-Stokes algorithm involving unstructured dynamic meshes

p 812 A92-46887

Unstructured and adaptive mesh generation for high Reynolds number viscous flows p 816 A92-47042

ADHESIVE BONDING

Non-chromated anodize resistance and adhesive bonding p 892 A92-47341 Use of adhesive bonded attachments for a composite p 785 A92-47414 aircraft fuel tank **ADHESIVES**

Low VOC primer for structural bonding --- volatile organic compound p 892 A92-47338

ADIABATIC CONDITIONS

Hypersonic flow past radiation-cooled surfaces

[MBB-FE-202-S-PUB-0468-A] p 832 N92-29713

AERIAL PHOTOGRAPHY

Computer-Controlled Navigation System/General Positioning System (CCNS/GPS) - A guidance, positioning, and management system for remote sensing flights p 840 A92-47630

AEROACOUSTICS

High-speed propeller noise prediction multidisciplinary approach p 924 A92-45831 The relationship between mode localization and energy

transmission parameters in the vibration of coupled structures p 925 A92-45921

Solutions of acoustic field problems using parallel omputers p 925 A92-45929 computers - Progress in Research on helicopter rotors

aerodynamics, aeroelasticity and acoustics p 849 A92-48589 [ONERA, TP NO. 1992-27] Influence of geometrical parameters on helicopter rotor

high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 Acoustic spinning-mode analysis by iterative threshold

method applied to a helicopter turboshaft engine [ONERA, TP NO. 1992-41] p 926 A92-48602 Research and studies on quiet helicopters

[ONERA, TP NO. 1992-59] A92-48618 p 926 Operational noise data for OH-58D Army helicopters IAD-A2468221 p 926 N92-28292 The design of test-section inserts for higher speed

aeroacoustic testing in the Ames 80- by 120-foot wind [NASA-TM-103915] p 927 N92-28909

Performance of uncoated AFRSI blankets during multiple Space Shuttle flights [NASA-TM-103892] p 890 N92-29104

AÈROASSIST

HANA code

Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment

INASA-TM-103925 I

p 852 N92-28721

AÉROBRAKING

A parametric analysis of radiative structure in aerobrake

| AIAA PAPER 92-2970 | p 816 A92-46985 Laminar hypersonic flow over a compression using the

[AIAA PAPER 92-2896]

p 820 A92-47872

AEF	300	YC	NΑ	MiÇ	BAL	ANCE

Periodic trim solutions with hp-version finite elements p 874 A92-46931 Computational aspects of helicopter trim analysis and damping levels from Floquet theory p 875 A92-46933
AERODYNAMIC CHARACTERISTICS

Spaceplane longitudinal aerodynamic paran estimation by cable-mount dynamic wind-tunnel test parameter |SAE PAPER 911980| p 788 A92-45385 Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds

[SAE PAPER 911981] p 788 A92-45386 Computational aerodynamics - The next generation SAE PAPER 911988 | p 788 A92-45390 ISAE PAPER 9119881 Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA'

p 843 A92-45410 ISAE PAPER 9120101 Aerodynamic characteristics near the tip of a finite wing by a panel method

[SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer p 790 A92-45419

[SAE PAPER 912029] Experimental and numerical study of aerodynamic characteristics for second generation SST

ISAE PAPER 9120561 p 844 A92-45439 AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pts. 1 & 2 p 791 A92-45476

Rapid synthesis for evaluating missile maneuverability

I AIAA PAPER 92-26151 p 873 A92-45488 Aerodynamic characteristics of hoar frost roughness p 808 A92-45829

Streamlines, vorticity lines, and vortices around p 808 A92-45845 three-dimensional bodies Comparison of six robustness tests evaluating missile autopilot robustness to uncertain aerodynamics

p 873 A92-46737 Flow over a twin-tailed aircraft at angle of attack. II -Temporal characteristics p 810 A92-46781 Comment on 'Canard-wing interaction in unsteady

p 812 A92-46820 supersonic flow Aerodynamic sensitivities for subsonic lifting-surface A92-47695

p 819 The A320 laminar fin programme [ONERA, TP NO. 1992-23] p 849 A92-48586 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft

[AIAA PAPER 92-3094] p 824 A92-48738 Pulse jet one-way valve performance

[AIAA PAPER 92-3169] p 863 A92-48790 NPSNET: Flight simulation dynamic modeling using quaternions

AD-A247484 p 923 N92-28245 Studies in general aviation aerodynamics

[NASA-CR-190431]

p 827 N92-28511 Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil

p 828 N92-28674 INASA-TM-1057431 Identification of aerodynamic models for maneuvering

INASA-CR-1904441 n 852 N92-28720

Explicit Navier-Stokes computation of turbomachinery flows

[AD-A249284] p 909 N92-28879 A comparison of the calculated and experimental

off-design performance of a radial flow turbine [NASA-CR-189207] p 831 p 831 N92-29402 Spatial and temporal adaptive procedures for the

unsteady aerodynamic analysis of airfoils using unstructured meshes p 831 N92-29445

[NASA-TM-107635] Computation of three-dimensional effects on two

dimensional wings [NASA-CR-190576] n 832 N92-29691

AFRODYNAMIC COEFFICIENTS

Determination of aerodynamic sensitivity coefficients based on the three-dimensional full potential equation p 798 A92-45525 [AIAA PAPER 92-2670]

LU-SGS implicit scheme for entry vehicle flow computation and comparison with aerodynamic data p 798 A92-45526 I AIAA PAPER 92-26711

On the aerodynamics/dynamics of store separation from hypersonic aircraft

[AIAA PAPER 92-2722] p 807 A92-45595 Optimum cruise lift coefficient in initial design of jet

p 845 A92-46806 Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N

p 828 N92-28674 Calculation of support interferences on the aerodynamic coefficients for a wind tunnel calibration model

p 830 N92-29159 IESA-TT-12471

Determination of aerodynamic sensitivity coefficients for wings in transonic flow

p 832 N92-29657 [NASA-CR-190570]

AERODYNAMIC CONFIGURATIONS Recent developments at the Shoeburyness STOVL test p 881 A92-45314 facility

improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations

[AIAA PAPER 92-2613] p 793 A92-45487 The design of a system of codes for industrial calculations of flows around aircraft and other complex aerodynamic configurations

I AIAA PAPER 92-26191 p 917 A92-45492 optimization of hypersonic Aerodynamic shape configurations including viscous effects

n 795 A92-45506 1 AIAA PAPER 92-26351 Commercial turbofan engine exhaust nozzle flow analyses using PAB3D

(AIAA PAPER 92-2701) p 801 A92-45543 Predicted pressure distribution on a prop-fan blade through Euler analysis p 810 A92-46791 Numerical simulation of multizone two-dimensional transonic flows using the full Navier-Stokes equations

p 815 A92-46955 Gridding strategies and associated results for winged p 918 A92-47051 entry vehicles An unstructured mesh generation algorithm for three-dimensional aeronautical configurations

p 918 A92-47053 Single block mesh generation for a fuselage plus two p 817 A92-47054

New concepts for multi-block grid generation for flow domains around complex aerodynamic configurations

p 817 A92-47079 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 Constrained spanload optimization for minimum drag of

multi-lifting-surface configurations p 828 N92-28660 (NLR-TP-89126-U) Aerodynamic design optimization using sensitivity analysis and computational fluid dynamics

SA-CASE-LAR-14815-1-CU] p 910 N92-29830

AERODYNAMIC DRAG

Low density heat transfer phenomena

[AIAA PAPER 92-2899] p 820 A92-47875 Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil p 828 N92-28674 [NASA-TM-105743]

Methods for direct simulation of transition in hypersonic p 912 N92-30064 boundary layers 2

AERODYNAMIC FORCES

Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental p 812 A92-46890 results Joint computational/experimental aerodynamics research on hypersonic vehicle. II - Computational p 812 A92-46891

AERODYNAMIC HEATING

Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows

(SAE PAPER 912044) p 791 A92-45428 Effect of the grid system on heat transfer computations for high speed flows p 900 A92-47071

Numerical experiments on unsteady shock reflection processes using the thin-layer Navier-Stokes equations p 818 A92-47155

Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects

p 821 A92-47892 I AIAA PAPER 92-29201 Ablation performance characterization of thermal protection materials using a Mach 4.4 Sled Test [AIAA PAPER 92-3055] p 893 A9 p 893 A92-48713

AERODYNAMIC INTERFERENCE

Whirl-flutter stability of a pusher configuration in p.845 A92-46813 nonuniform flow Evaluation of measured-boundary-condition methods for

3D subsonic wall interference INLR-TR-88072-U1 p 832 N92-29884

AERODYNAMIC LOADS

Prediction of rotor unsteady airloads using vortex filament theory

[AIAA PAPER 92-2610] p 792 A92-45484 Design load predictions on a fighter-like aircraft wing

p 811 A92-46797 Time-average loading on a two-dimensional airfoil in a large amplitude motion n 811 A92-46805 buffet loads on the Statistical prediction of maximum p 811 A92-46816

Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Reduction and analysis of F-111C flight data

p 853 N92-28771 IAD-A2503411

Status of the FAA flight loads monitoring program p 914 N92-30113

AERODYNAMIC NOISE

Relationship between the instability waves and noise of high-speed lets p 924 A92-45835 Boundary layer induced noise in aircraft ICUED/A-AERO/TR-181 p. 92

p 927 N92-29201

AERODYNAMIC STABILITY

Whirl-flutter stability of a pusher configuration in nonuniform flow p 845 A92-46813 Aeromechanical stability of hingeless helicopter rotors forward flight

AERODYNAMIC STALLING

Numerical simulations of separated flows around oscillating airfoil for dynamic stall phenomena

[SAE PAPER 911991] p 788 A92-45393 Static and dynamic flow field development about a p 788 A92-45393 porous suction surface wing p 795 A92-45500 I AIAA PAPER 92-2628 I

A LEX blowing technique for post-stall lateral control of trapezoidal wings

IAIAA PAPER 92-27141 p 802 A92-45553 Exploratory investigation of a spanwise blowing concept for tip-stall control on cranked-arrow wings

[AIAA PAPER 92-2637] n 806 A92-45576 Chaotic oscillation in helicopter blade stall response p 846 A92-46922

AFRODYNAMICS

High-Revnolds-number test requirements in low-speed aerodynamics p 787 A92-45263 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings

[SAE P-246] p 783 A92-45376 Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Forebody flow control on a full-scale F/A-18 aircraft IAIAA PAPER 92-2674] p 806 A92-45583

Flight deck aerodynamics of a nonaviation ship p 810 A92-46790

Forebody vortex control using small, rotatable strakes

Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Grid adaptation to multiple functions for applied erodynamic analysis p 817 A92-47045 aerodynamic analysis Experimental aerodynamic facilities of the Aerodynamics

Research and Concepts Assistance Branch [AD-A247489] n 883 N92-28248

Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing INASA-TM-1075861 p 850

D 850 N92-28435 Application of piloted simulation to high-angle-of-attack flight-dynamics research for fighter aircraft

p 886 N92-28551 Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712 Nonlinear normal and axial force indicial responses for a two dimensional airfoil

[AD-A247196] p 830 N92-28888 Parameter identification for nonlinear aerodynamic systems

[NASA-CR-190264] p 830 N92-29329 Second-order shock-expansion theory extended to include real gas effects p 831 N92-29539

Aerodynamic design optimization using sensitivity analysis and computational fluid dynamics [NASA-CASE-LAR-14815-1-CU] p 910 N92-29830

A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042

Non-linear interactions in homogeneous turbulence with and without background rotation p 912 N92-30044 **AEROELASTICITY**

Response characteristics of a wing in supersonic flow near flutter boundary [SAE PAPER 911999] p 789 A92-45401

On-line performance evaluation of multiloop digital control systems p 873 A92-46739 Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts

p 873 A92-46752 Navier-Stokes computations on swept-tapered wings, p 810 A92 46786 including flexibility An aeroelastic analysis with a generalized dynamic p 847 A92-46932

Research on helicopter rotors Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589

Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608

Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28471

Computer-Controlled Navigation System/General

Loran-C performance assurance assessment program

A preliminary design and analysis of an advanced

DLR research reports and communications

p 840 A92-47630

p 840 N92-28718

p 929 N92-29218

p 841 N92-29605

p 871 N92-29427

Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefield flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments AIAA PAPER 92-2871 p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reently condition AIAA PAPER 92-2951 p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter AIAA PAPER 92-2953 p 821 A92-47917 Naval aircraft/engine mission payoff analyses AIAA PAPER 92-3473 p 865 A92-49019 Steady and Transient Performance Prediction of Gas
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 Naval aircraft/engine mission payoff analyses [AIAA PAPER 92-2473] p 865 A92-49019
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefield flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefield flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reently condition [AIAA PAPER 92-2951] p 821 A92-47915
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefield flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Examination of ultraviolet radiation theory for bow shock rocket experiments
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefield flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Analysis of thermo-chemical nonequilibrium models for
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430 Waves and thermodynamics in high Mach number
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 Energy analysis of high-speed flight systems p 925 A92-46430
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714 EROTHERMODYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Aerothermal ablation behavior of selected candidate external insulation materials
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena. [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena
configurations [AIAA PAPER 92-2613] p 793 A92-45487 EROTHERMOCHEMISTRY
configurations [AIAA PAPER 92-2613] p 793 A92-45487
the state of the s
EROSPACE VEHICLES An improved approach for the computation of
(ÁIAÁ PAPER 92-3757) p 867 A92-49114
Emerging technologies for gas turbine engines - U.A.V. synergies
EROSPACE TECHNOLOGY TRANSFER
space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680
Aerothermodynamic challenges of the Saenger
Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649
Aerothermodynamics and propulsion integration in the
aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648
propulsion integration. Numerical and experimental
Technology programme: Aerothermodynamics and
requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629
Saenger: The reference concept and its technological
Thrust/speed effects on long-term dynamics of aerospace planes p 889 A92-46766
[AIAA PAPER 92-2629] p 844 A92-45501
aerodynamics High Speed Civil Transport
[SAE PAPER 912071] p 891 A92-45451 Effects of wing planform on HSCT off-design
Aerospace plane hydrogen scramjet boosting
estimation by cable-mount dynamic wind-tunnel test [SAE PAPER 911980] p 788 A92-45385
Spaceplane longitudinal aerodynamic parameter
control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384
Estimation of spaceplane lateral-directional stability and
Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376
Conference and Aircraft Symposium, 29th, Gifu, Japan,
EROSPACE PLANES International Pacific Air and Space Technology
[ETN-92-91391] p 929 N92-29218
DLR research reports and communications
cooperative research LR-662 p 887 N92-28579
The basic research simulator programme and the industrial and aerospace community: Opportunities for
[SAE AIR 1168/7] p 849 A92-48022
Aerospace pressurization system design
Applied aerodynamics education - Design and science [AIAA PAPER 92-2662] p 928 A92-45581
EROSPACE ENGINEERING
present [AERO-REPT-8907] p 910 N92-29683
Actoriablical Engineering Group publications, 1000
Aeronautical Engineering Group publications, 1950 -
[NASA-CR-189595] p 888 N92-29352 IERONAUTICAL ENGINEERING Agronautical Engineering Group publications 1950 -
Buffet test in the National Transonic Facility [NASA-CR-189595] p 888 N92-29352 IERONAUTICAL ENGINEERING
[NASA-CR-189595] p 888 N92-29352 REPONAUTICAL ENGINEERING

AIR NAVIGATION Saenger: The reference concept and its technological requirements - aerothermodynamics p 890 N92-29629 Positioning System (CCNS/GPS) - A guidance, positioning, [MBB-FE-202-S-PUB-0463-A] Technology programme: Aerothermodynamics and and management system for remote sensing flights propulsion integration. Numerical and experimental erothermodynamics IMBB-FE-202-S-PUB-0464-A1 p 831 N92-29648 [NASA-CR-190469] Aerothermodynamics and propulsion integration in the Saenger technology programme IMBB-FE-202-S-PUB-0469-A1 IETN-92-913911 p 831 N92-29649 European studies to investigate the feasibility of using 1000 ft vertical separation minima above FL 290. Part 1: of the Saenger Aerothermodynamic challenges space-transportation system IMBB-FE-202-S-PUB-0462-A Overview of organisation, techniques employed, and p 890 N92-29680 conclusions Hypersonic flow past radiation-cooled surfaces [NLR-TP-91062-U-PT-1] p 832 N92-29713 IMBB-FE-202-S-PUB-0468-A] AIR SAMPLING Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle heat-rejection system for an extreme altitude advanced p 787 N92-30232 [MBB/FE202/S/PUB/461] variable cycle diesel engine installed in a high-altitude AGING advanced research platform The FAA aging airplane program plan for transport INASA-CR-186021] p 838 N92-30128 aircraft Ageing aircraft research in the Netherlands p 838 N92-30129 Survey of French activities concerning structural rworthiness and aging aircraft p 838 N92-30130 airworthiness and aging aircraft Transport Canada aging aircraft activities p 838 N92-30131 AGING (MATERIALS) Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 The 1991 International Conference on Aging Aircraft and Structural Airworthiness [NASA-CP-3160] p 912 N92-30106 Structural integrity of future aging airplanes p 913 N92-30107 Performance of fuselage pressure structure p 913 N92-30109 Federal Aviation Administration aging aircraft nondestructive inspection research plan p 914 N92-30116 **AGREEMENTS** Ageing aircraft research in the Netherlands p 838 N92-30129 AH-64 HELICOPTER The use of a dedicated testbed to evaluate simulator p 884 N92-28533 training effectiveness AIR BREATHING ENGINES High-speed flight propulsion systems --- Book [ISBN 1-56347-011-X] p 862 A92-46426 Introduction --- propulsion system performance for hypersonic vehicles p 862 A92-46427 Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Energy analysis of high-speed flight systems p 925 A92-46430 Laser-initiated conical detonation wave for supersonic combustion III [AIAA PAPER 92-3247] p 893 A92-48846 Restart of theory of air-breathing engines p 906 A92-49018 IAIAA PAPER 92-34721 Users manual for updated computer code for axial-flow compressor conceptual design INASA-CR-1891711 p 924 N92-30207 AIR DATA SYSTEMS Absolute fiber optic pressure transducer for aircraft air data measurement p 858 A92-48501 A simple and low cost system to measure delay times pneumatic systems p 859 N92-28644 (NLR-TP-90174-U) AIR DUCTS Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) p 867 A92-49120 [AIAA PAPER 92-3776] AIR FLOW Computational fluid dynamics applications in airplane cabin ventilation system design p 788 A92-45394 ISAE PAPER 9119921 The effect of molecular relaxation processes in air on p 898 A92-45883

the rise time of sonic booms

[NASA-CASE-LAR-14612-1]

AIR INTAKES

AIR LAW

the engine intake

Flight deck aerodynamics of a nonaviation ship

Segmental heat transfer in a pin fin channel with ejection

Active thermal isolation for temperature responsive

Configuration effects on the ingestion of hot gas into

Airline deregulation - Impact on human factors

p 810 A92-46790

p 900 A92-47267

p 911 N92-29954

p 842 A92-45315

p 834 A92-44999

AIR TRAFFIC High speed VSTOL on the horizon - The answer to ISAE PAPER 9119761 p 843 A92-45383 FAA aviation forecasts [AD-A250412] p 837 N92-29182 European studies to investigate the feasibility of using 1000 ft vertical separation minima above FL 290. Part 1 Overview of organisation, techniques employed, and conclusions [NLR-TP-91062-U-PT-1] p 841 N92-29605 AIR TRAFFIC CONTROL Mode S data link pilot-system interface - A blessing in p 839 A92-44920 de skies or a beast of burden? Who or what saved the day? A comparison of traditional and class cockpits p 833 A92-44931 Perspective versus plan view air traffic control (ATC) displays - Survey and empirical results p 896 A92-44967 Real targets, unreal displays - The inadvertent p 839 A92-44969 suppression of critical radar data Real-time control tower simulation for evaluation of p 879 A92-44976 airport surface traffic automation Operational evaluation of a tower workstation for clearance delivery p 879 A92-44981 Putting the control back in air traffic control - An enhanced Universal Development Simulation System p 916 A92-44982 Full model simulation of the National Airspace System Research and training platform p 880 A92-45042 $\label{lem:empirical} \mbox{Empirical foundations and sensitivity testing - Is it enough}$ for the 90's? p 835 A92-45054 FAA aviation forecasts IAD-A2504121 p 837 N92-29182 NARSIM: A real-time simulator for air traffic control [NLR-TP-90147-U] p 888 N92-29204 Application of VME-technology on an airborne data link processor unit NLR-MP-88040-U1 p 841 N92-29615 AIR TRAFFIC CONTROLLERS (PERSONNEL) Perspective versus plan view air traffic control (ATC) displays - Survey and empirical results p 896 A92-44967 AIR TRANSPORTATION Safety vs. economy, system-theoretic approach to the p 916 A92-45002 problem analysis Judgement training for Alaskan pilots p 835 A92-45048 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 AIRBORNE EQUIPMENT Life cycle costs of the C-130 electrical power system p 786 N92-28348 IAD-A2467591 Applications of ASICs to avionics AGARD-AG-329 J p 859 N92-28376 AIRBORNE RADAR Motion errors in an airborne synthetic aperture radar p 840 A92-48416 AIRRORNE/SPACEBORNE COMPUTERS Airborne Data Acquisition and Relay System p 839 A92-47574 NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May 20-24, 1991, Vols. 1-3 HSBN 0-7803-0084-X1 p 786 A92-48426 A high performance general purpose processing element p 920 A92-48440 for avionic applications Application of VME-technology on an airborne data link processor unit NLR-MP-88040-U1 p 841 N92-29615 **A-3**

AIRCRAFT	Calculation of unsteady subsonic and supersonic flow	Results and lessons learned from the STOL and
International Pacific Air and Space Technology	about oscillating wings and bodies by new panel	Maneuver Demonstration Program
Conference and Aircraft Symposium, 29th, Gifu, Japan,	methods	[SAE PAPER 912005] p 843 A92-45406
Oct. 7-11, 1991, Proceedings SAE P-246 p 783 A92-45376	[NLR-TP-89119-U] p 827 N92-28659	Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA'
AIRCRAFT ACCIDENT INVESTIGATION	Modular simulation of HEI fragments and blast	[SAE PAPER 912010] p 843 A92-45410
An aircraft landing accident caused by visually induced	pressure [AD-A248205] p 910 N92-29191	Aero-structural integrated design of forward swept
spatial disorientation p 834 A92-44993	AIRCRAFT CONSTRUCTION MATERIALS	wing
The development of an intelligent human factors data	Structural concept of main wings of high altitude	[SAE PAPER 912021] p 790 A92-45414
base as an aid for the investigation of aircraft accidents	unmanned aerial vehicle and basic properties of	Feasibility study on a microwave-powered unmanned
p 928 A92-44994	thermoplastic composites as candidate material	aerial vehicle for the communication relay utilization
Stop, look and learn from accident investigation p 834 A92-44996	[SAE PAPER 912053] p 843 A92-45437	[SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude
The effectiveness of training programs for preventing	Composites in manufacturing - Case studies	unmanned aerial vehicle and basic properties of
aircrew 'error' p 834 A92-44997	[ISBN 0-87263-406-X] p 784 A92-47403	thermoplastic composites as candidate material
The effect on aircraft evacuations of passenger	The impact of advanced materials on small turbine	[SAE PAPER 912053] p 843 A92-45437
behaviour and smoke in the cabin p 834 A92-44998	engines [SAE PAPER 911207] p 862 A92-48021	Experimental and numerical study of aerodynamic
Organizational factors in human factors accident	Apparatus for elevated temperature compression or	characteristics for second generation SST
investigation p 834 A92-45000	tension testing of specimens	[SAE PAPER 912056] p 844 A92-45439
Judgement training for Alaskan pilots p 835 A92-45048	[NASA-CASE-LAR-14775-1] p 912 N92-30099	Integrated wiring system [SAE PAPER 912058] p 897 A92-45440
Rejected takeoffs - Causes, problems, and	AIRCRAFT CONTROL	Effects of wing planform on HSCT off-design
consequences p 835 A92-45052	Safety vs. economy, system-theoretic approach to the	aerodynamics High Speed Civil Transport
ICAO Flight Safety and Human Factors Programme	problem analysis p 916 A92-45002	[AIAA PAPER 92-2629] p 844 A92-45501
p 835 A92-45055	Hot gas ingestion characteristics and flow visualization	Determination of aerodynamic sensitivity coefficients
Mandatory psychological testing of pilots as a	of a vectored thrust STOVL concept	based on the three-dimensional full potential equation
requirement for licensing in Norway?	p 860 A92-45316	[AIAA PAPER 92-2670] p 798 A92-45525
p 835 A92-45081 AIRCRAFT ACCIDENTS	An acrobatic airship 'Acrostat'	Analysis of a pneumatic forebody flow control concept about a full aircraft geometry
Spectrogram diagnosis of aircraft disasters	[SAE PAPER 911994] p 843 A92-45396	[AIAA PAPER 92-2678] p 799 A92-45530
[SAE PAPER 912041] p 836 A92-45425	Development of the DDV actuation system on the IDF aircraft	Surface grid generation in a parameter space
Drop test: Cessna Golden Eagle 421B	(SAE PAPER 912080) p 844 A92-45455	[AIAA PAPER 92-2717] p 803 A92-45556
[DOT/FAA/CT-TN91/32] p 837 N92-28900	A design of strongly stabilizing controller	Applied Computational Aerodynamics - Case studies
AIRCRAFT ANTENNAS	[SAE PAPER 912081] p 917 A92-45456	[AIAA PAPER 92-2661] p 845 A92-45580
IsoDoppler and mocomp corrections improve MTI	Analysis of a pneumatic forebody flow control concept	Applied aerodynamics education - Design and science
radar p 898 A92-45774 AIRCRAFT BRAKES	about a full aircraft geometry	[AIAA PAPER 92-2662] p 928 A92-45581 Integrated aeroservoelastic wing synthesis by nonlinear
Characterization of thermal performance of wheel	[AIAA PAPER 92-2678] p 799 A92-45530	programming/approximation concepts
outboard of an aircraft p 849 A92-48352	A new milestone in automatic aircraft control - Fly-by-light	p 873 A92-46752
AIRCRAFT CARRIERS	systems transmit commands optoelectronically	Design load predictions on a fighter-like aircraft wing
Aircraft ship operations	p 784 A92-45699	p 811 A92-46797
[AGARD-AR-312] p 850 N92-28468	Fiber optic controls for aircraft engines - Issues and	System for generating sequences of phased gust or taxi
AIRCRAFT COMMUNICATION	implications p 856 A92-46244	loadings p 845 A92-46800
Data Link integration in commercial transport	Potential for integrated optical circuits in advanced aircraft with fiber optic control and monitoring systems	Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806
operations p 839 A92-44919 Airborne/shipborne PSK telemetry data link	p 856 A92-46246	aircraft p 845 A92-46806 Minimizing supersonic wave drag with physical
p 839 A92-47511	X-29 H-infinity controller synthesis	constraints at design and off-design Mach numbers
An analysis of aircrew communication patterns and	p 873 A92-46749	p 811 A92-46808
content	Forebody vortex control using small, rotatable strakes	Wing mass formula for subsonic aircraft
[AD-A246618] p 907 N92-28253	p 811 A92-46798	p 845 A92-46812
AIRCRAFT COMPARTMENTS	Study on two variable control plan for twin spool turbojet	Optimization of constant altitude-constant airspeed flight of turbojet aircraft p 845 A92-46815
The effect on aircraft evacuations of passenger	engine p 862 A92-47697	
	Aircraft stabilization at large angles of attack	
behaviour and smoke in the cabin p 834 A92-44998 Computational fluid dynamics applications in airplane	Aircraft stabilization at large angles of attack	Filament winding of composite isogrid fuselage structures p 784 A92-47405
behaviour and smoke in the cabin p 834 A92-44998 Computational fluid dynamics applications in airplane cabin ventilation system design	p 875 A92-47785	rilament winding of composite isogrid tuselage structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using
Computational fluid dynamics applications in airplane		structures p 784 A92-47405
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor	p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969	p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487	structures p 784 A92-47405 Design and test of aircraft aff fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design	p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS	Fiber-optic position transducers for aircraft controls p 857 A92-4785 p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for	p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor 320 B-1B excels in conventional role p 786 A92-47971
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47769 A340 handling, cockpit design improve on predecessor p 849 A92-47969 B-1B excels in conventional role p 786 A92-47971 US Navy revisits escape modules p 849 A92-47975
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47762 A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 AFORDER OF A APENDER OF A APE	Fiber-optic position transducers for aircraft controls p 857 A92-4785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654	structures p 784 A92-47405 Design and test of aircraft aft uselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach?
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIR CRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design	Fiber-optic position transducers for aircraft controls p 857 A92-47785 p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airptane F-117 aircraft p 849 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role p 786 A92-47971 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 AFORDER OF A APENDER OF A APE	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL	structures p 784 A92-47405 Design and test of aircraft aft uselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach?
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIR CRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations	Fiber-optic position transducers for aircraft controls p 857 A92-47785 p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airptane F-117 aircraft p 849 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role US Navy revisits escape modules p 786 A92-47971 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485	Fiber-optic position transducers for aircraft controls p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47969 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47406 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47959 B-1B excels in conventional role p 786 A92-47971 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIR CRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration	Fiber-optic position transducers for aircraft controls p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 849 A92-47629 The airptane F-117 aircraft p 849 A92-47629 The airptane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3322] p 850 A92-48915 Emerging airframe/propulsion integration technologies
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 789 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration	P 875 A92-47785 Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28584 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [JAIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48047 The propulsive-only flight control problem p 876 A92-48047 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47406 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47629 The airplane F-117 aircraft p 849 A92-47629 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational ticing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48913 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 789 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration	Fiber-optic position transducers for aircraft controls p 875 A92-48041 The propulsive-only flight control problem p 876 A92-48047 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28584 N92-28584 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL design p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47406 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47959 B-1B excels in conventional role p 786 A92-47971 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V.
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2629] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations	Fiber-optic position transducers for aircraft controls p 875 A92-47785 Fiber-optic position transducers for aircraft controls p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48487 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47406 The effect of composite material allowable changes on VTOL airframe weights p 849 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47959 B-1B excels in conventional role p 786 A92-47969 US Navy revisits escape modules p 849 A92-47971 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIR CRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28554 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-2461] The high speed challenge for rotary wing aircraft	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47595 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 850 A92-48915 Emerging airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3335] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-47769 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435
Computational fluid dynamics applications in airplane cabin ventilation system design SAE PAPER 911992 p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design SAE AIR 1168/7 p 849 A92-47969 Aerospace pressurization system design SAE AIR 1168/7 p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program SAE PAPER 912006 p 783 A92-45407 An economic approach to accurate wing design SAE PAPER 912008 p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations IAIAA PAPER 92-2611 p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration See PAPER 91-2618 p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport AIAA PAPER 92-2629 p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations AIAA PAPER 92-2721 p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of a flat plate	Fiber-optic position transducers for aircraft controls p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47609 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-477639 B-1B excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational ticing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAFER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47406 The effect of composite material allowable changes on VTOL airframe weights p 849 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 p 849 A92-47969 B-1B excels in conventional role p 786 A92-47969 US Navy revisits escape modules p 849 A92-47971 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIR CRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacefle isolated and in proximity of a flat plate [AIAA PAPER 92-2723] p 803 A92-45560	Fiber-optic position transducers for aircraft controls p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47969 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3757] p 867 A92-48911 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28471
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of allat plate [AIAA PAPER 92-2723] p 803 A92-4560 Whirl-flutter stability of a pusher configuration in nonuniform flow p 845 A92-46813 Grid generation and compressible flow computations	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Today and tomorrow	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panets p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-47769 B-1B excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28472
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport IAIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of a flat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonuniform flow Grid generation and compressible flow computations about a high-speed civil transport configuration	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45304 Evolution of ASTOVL aircraft design p 842 A92-45301 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Today and tomorrow [SAE PAPER 911989] p 788 A92-45391	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-47763 A340 handling, cockpit design improve on predecessor A320 B-18 excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28472 Multidisciplinary design and optimization
Computational fluid dynamics applications in airplane cabin ventilation system design SAE PAPER 911992 p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design SAE AIR 1168/7 p 849 A92-48022 AIRCRAFT CONFIGURATIONS p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft Update of the X-29 high-angle-of-attack program SAE PAPER 912006 p 783 A92-45407 An economic approach to accurate wing design SAE PAPER 912008 p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations p 789 A92-45485 Two-point optimization of complete three-dimensional airplane configuration p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport IAIAA PAPER 92-2611 p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations p 844 A92-45560 Whirf-flutter stability of a pusher configuration in nonuniform flow Grid generation and compressible flow computations about a high-speed civil transport configuration p 945 A92-45613	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45304 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft (SAE PAPER 911974) p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Today and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design -	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47969 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28472 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of altat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonuniform flow p 845 A92-46813 Grid generation and compressible flow computations about a high-speed civil transport configuration p 919 A92-47055 A geometry-integrated approach to multiblock grid	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAFER 911974] p 842 A92-45381 The fatigue scalter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAFER 911984] p 843 A92-45381 The international computational p 788 A92-45391 Computational aerodynamics in aircraft design - Challenges and opportunities for Euler/Navier-Stokes	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 The airplane F-117 aircraft p 849 A92-47769 B-18 excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3757] p 867 A92-48911 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28471 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Mathematical optimization: A powerful tool for aircraft
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics—High Speed Civil Transport IAIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of a flat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonuniform flow p 845 A92-46813 Grid generation and compressible flow computations about a high-speed civil transport configuration p 919 A92-47055 A geometry-integrated approach to multiblock grid generation p 919 A92-47083	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Toddy and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design - Challenges and opportunities for Euler/Navier-Stokes methods	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-47769 B-1B excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational ticing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48593 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28471 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Mathematical optimization: A powerful tool for aircraft design p 851 N92-28474
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of altat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonuniform flow p 845 A92-46813 Grid generation and compressible flow computations about a high-speed civil transport configuration p 919 A92-47055 A geometry-integrated approach to multiblock grid	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45304 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Today and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design - Challenges and opportunities for Euler/Navier-Stokes methods [SAE PAPER 911990] p 788 A92-45392	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 The airplane F-117 aircraft p 849 A92-47769 B-18 excels in conventional role US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3757] p 867 A92-48911 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28471 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Mathematical optimization: A powerful tool for aircraft
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2721] p 803 A92-45559 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45559 Viscous flow past a nacelle isolated and in proximity of a flat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonuniform flow generation and compressible flow computations about a high-speed civil transport configuration p 919 A92-47055 A geometry-integrated approach to multiblock grid generation [AIAA PAPER 92-3097] p 849 A92-48739	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45387 The impact of CFD on the airplane design process - Toddy and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design - Challenges and opportunities for Euler/Navier-Stokes methods	structures p 784 A92-47405 Design and test of aircraft aft tuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47629 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-477629 The airplane F-117 aircraft p 849 A92-477639 B-18 excels in conventional role US Navy revisits escape modules p 786 A92-47975 Trends in commercial aircraft design What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational ticing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example p 851 N92-28472 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Mathematical optimization: A powerful tool for aircraft design p 851 N92-28473 Use of a virtual cockpit for the development of a future
Computational fluid dynamics applications in airplane cabin ventilation system design [SAE PAPER 911992] p 788 A92-45394 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-47969 Aerospace pressurization system design [SAE AIR 1168/7] p 849 A92-48022 AIRCRAFT CONFIGURATIONS An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 An economic approach to accurate wing design [SAE PAPER 912006] p 789 A92-45408 High speed aerodynamics of upper surface blowing aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485 Two-point optimization of complete three-dimensional airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 Effects of wing planform on HSCT off-design aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501 Prismatic grid generation with an efficient algebraic method for aircraft configurations [AIAA PAPER 92-2721] p 803 A92-45590 Viscous flow past a nacelle isolated and in proximity of aflat plate [AIAA PAPER 92-2723] p 803 A92-45560 Whirl-flutter stability of a pusher configuration in nonunitorm flow p 845 A92-46813 Grid generation and compressible flow computations about a high-speed civil transport configuration in nonunitorm flow p 945 A92-47055 A geometry-integrated approach to multiblock grid generation of transport configuration interference effects on a transport aircraft configuration interference	Fiber-optic position transducers for aircraft controls p 857 A92-48041 The propulsive-only flight control problem p 876 A92-48041 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654 AIRCRAFT DESIGN An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives [SAE PAPER 911984] p 843 A92-45391 The impact of CFD on the airplane design process - Today and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design - Challenges and opportunities for Euler/Navier-Stokes methods [SAE PAPER 911990] p 788 A92-45392 An acrobatic airship 'Acrostat'	structures p 784 A92-47405 Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406 Design and use of aramid fiber in aircraft structures p 784 A92-47407 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 The airplane F-117 aircraft p 849 A92-47759 A340 handling, cockpit design improve on predecessor A320 B-1B excels in conventional role US Navy revisits escape modules p 849 A92-47969 US Navy revisits escape modules p 849 A92-47975 Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 A92-48793 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 Emerging technologies for gas turbine engines - U.A.V. synergies [AIAA PAPER 92-3757] p 867 A92-49114 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an example Structural optimization of aircraft p 851 N92-28471 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Mathematical optimization: A powerful tool for aircraft design user of a virtual cockpit for the development of a future transport aircraft p 86 N92-28547

SUBJECT INDEX AIRCRAFT PARTS

Constrained spanload optimization for minimum drag of Turbine aircraft engine operational trending and JT8D AIRCRAFT MAINTENANCE tatic component reliability study multi-lifting-surface configurations Reliability centered maintenance for metallic airframes p 828 N92-28660 p 870 N92-28686 based on a stochastic crack growth approach INLR-TP-89126-U IDOT/FAA/CT-91/101 Flight evaluation of an extended engine life mode on p 897 A92-45242 Quaternion and Euler angles in kinematics an F-15 airplane p 909 N92-28836 Structural risk assessment in the Israel Air Force for INAL-TM-6361 p 871 N92-29659 p 836 A92-46779 INASA-TM-1042401 Aerodynamic characteristics obtained from alpha sweep fleet management Current and future developments in civil aircraft test of the quiet STOL experimental aircraft ASKA Advanced composite components in airline service p 853 N92-28901 non-destructive evaluation from an operator's point of INAL-TR-11121 status and repair p 785 A92-47416 p 787 N92-30122 Improving designer productivity --- artificial intelligence A field repair of advanced helicopter vertical fin AIRCRAFT EQUIPMENT [NASA-TM-103929] p 854 N92-29417 structure p 785 A92-47417 Remote measurements of supercooled integrated liquid Concurrent engineering in design of aircraft structures Industrial practice in aeronautical maintenance water during WISP/FAA aircraft icing program |MBB-FE-2-S-PUB-472| p 854 N92-29650 p 786 A92-47774 p 915 A92-46788 AIRCRAFT ENGINES The application of multimedia expert systems to the Advanced pneumatic impulse ice protection system Elevated temperature crack growth in aircraft engine depot level maintenance environment p 845 A92-46807 p 891 A92-45234 (PIIP) for aircraft p 922 A92-48557 Design criteria and analysis of the dynamic behavior VSTOL engine design evolution - Growth of the Pegasus p 860 A92-45306 engine for Harrier of high speed, heavily loaded and precision epicyclic gears Application of knowledge-based systems for diagnosis of aircraft systems Current technology propulsion systems meet the STOVL for aircraft use INLR-TP-90192-UI p 837 N92-28655 window of opportunity IAIAA PAPER 92-34911 n 906 A92-49028 p 860 A92-45307 AIRCRAFT FUELS Report on the workshop on Ion Implantation and Ion A USAF assessment of STOVL fighter options Microbiological spoilage of aviation turbine fuel, II p 842 A92-45310 Beam Assisted Deposition Evaluation of a suitable biocide p 891 A92-45600 IAD-A2505611 p 927 N92-28923 Auxiliary power units for current and future aircraft ISAE PAPER 9120591 p 862 A92-45441 AIRCRAFT GUIDANCE Generation of spectra and stress histories for fatigue Fiber optic controls for aircraft engines - Issues and The appropriate concern for possible aberrations in and damage tolerance analysis of fuselage repairs p 839 A92-44932 landing guidance signals p 856 A92-46244 LAD-A2503901 p 854 N92-29180 implications Bearing servicing tool
[NASA-CASE-MSC-21881-1] Approach guidance in a downburst High-speed flight propulsion systems --- Book p 873 A92-46741 [ISBN 1-56347-011-X] p 862 A92-46426 p 912 N92-30082 Computer-Controlled Navigation System/General The 1991 International Conference on Aging Aircraft and Introduction --- propulsion system performance for p 862 A92-46427 hypersonic vehicles Positioning System (CCNS/GPS) - A guidance, positioning, Structural Airworthiness p 912 N92-30106 and management system for remote sensing flights Propulsion systems from takeoff to high-speed flight [NASA-CP-3160] p 840 A92-47630 p 889 A92-46428 Maintaining the safety of an aging fleet of aircraft p 837 N92-30108 Mathematical modeling of the flight of passenger aircraft On the optimization of windshear warning and guidance in the case of engine failure p 875 A92-47777 Current DOT research on the effect of multiple site systems Concept of a one-dimensional model of the dynamic INI R-TP-90196-U1 n 837 N92-29703 damage on structural integrity p 913 N92-30112 A manufacturer's p 862 A92-47791 Inspection of aging aircraft: behavior of a gas turbine AIRCRAFT HAZARDS manufacturer's p 914 N92-30117 perspective CIS engines. I - The range revealed Aircraft-triggered lightning - Processes following strike p 786 A92-47821 p 836 A92-46784 The FAA aging airplane program plan for transport initiation that affect aircraft Investigation of the structural inhomogeneity of a p 838 N92-30128 AIRCRAFT ICING p 893 A92-47958 Ageing aircraft research in the Netherlands On the possibility of freezing and sticking phenomena The impact of advanced materials on small turbine p 838 N92-30129 in a transport during the ground taxiing and takeoff run engines Survey of French activities concerning structural and on the preventions of the hazard p 862 A92-48021 p 838 N92-30130 | SAE PAPER 911207| [SAE PAPER 912042] airworthiness and aging aircraft p 836 A92-45426 p 926 A92-48500 Optics in aircraft engines Transport Canada aging aircraft activities BUWICE - An interactive icing program applied to engine Design and test of an Active Tip Clearance System for p 838 N92-30131 centrifugal compressors Aging commuter aeroplanes: Fatigue evaluation and [AIAA PAPER 92-3179] p 922 A92-48794 p 863 A92-48801 p 915 N92-30132 IAIAA PAPER 92-31891 control methods AIRCRAFT INDUSTRY A manufacturer's approach to Aero mechanics in the twenty-first century ensure long term German-GUS cooperation in civil aviation (AJAA PAPER 92-31941 p 863 A92-48805 structural integrity p 838 N92-30133 p 785 A92-47592 Prediction of a high bypass ratio engine exhaust nozzle AIRCRAFT MANEUVERS Fundamentals of structural optimisation Toward an integrated multimodal approach to flight p 851 N92-28470 p 880 A92-45026 [AIAA PAPER 92-3259] n 864 A92-48855 simulation The 1991 International Conference on Aging Aircraft and Results and lessons learned from the STOL and A simplified real-time engine model for developing aeroengine control system Structural Airworthiness Maneuver Demonstration Program INASA-CP-31601 p 912 N92-30106 p 843 A92-45406 LAIAA PAPER 92-33211 p 864 A92-48904 (SAE PAPER 912005) Measurement of scalar flowfield at exit of combustor NDE research efforts at the FAA Center for Aviation Parameter identification of linear systems based on Systems Reliability p 914 N92-30119 sector using Raman diagnostics smoothing p 873 A92-46742 [AIAA PAPER 92-3350] p 894 A92-48927 Current and future developments in civil aircraft Fighter airframe/propulsion integration - A McDonnell Experimental pyrometer system for a gas turbine non-destructive evaluation from an operator's point of Aircraft perspective [AIAA PAPER 92-3333] engine p 787 N92-30122 p 850 A92-48916 [AIAA PAPER 92-3482] p 859 A92-49022 Identification of aerodynamic models for maneuvering AIRCRAFT INSTRUMENTS Design issues in a fiber optic sensor system architecture Civil development and certification of a helicopter aircraft for aircraft engine control [NASA-CR-190444] p 852 N92-28720 automatic approach and hover system on the Sikorsky 1AJAA PAPER 92-34831 p 866 A92-49023 Feedback control laws for highly maneuverable Subsonic flight test evaluation of a propulsion system aircraft [SAE PAPER 911975] p 872 A92-45382 parameter estimation process for the F100 engine [NASA-CR-190535] p 879 N92-29654 Avionics flight systems for the 21st century I AIAA PAPER 92-37451 p 866 A92-49110 AIRCRAFT MODELS p 784 A92-45421 ISAE PAPER 9120331 Generators inside small engines In-flight simulation of backside operating models using Functional mock-up tests for flight control system of the p 867 A92-49113 [AIAA PAPER 92-3755] direct lift controller NAL QSTOL research aircraft 'ASKA ISAE PAPER 9120691 Engine aircraft systems integration course p 872 A92-45450 [SAE PAPER 912036] p 881 A92-45422 [AIAA PAPER 92-3762] p 928 A92-49117 Aircraft spoiler effects under wind shear Through the looking glass --- effectiveness of electronic p 796 A92-45509 Conceptual study of separated core ultra high bypass | AIAA PAPER 92-2642 | p 856 A92-46449 flight instrument systems Parameter identification of linear systems based on [AIAA PAPER 92-3775] Common airborne instrumentation system (CAIS) --p 873 A92-46742 p 867 A92-49119 Pitch rate/sideslip effects on leading-edge extension Analytical and experimental studies of heat pipe radiation time-division multiplexed data acquisition system p 856 A92-47538 cooling of hypersonic propulsion systems vortices of an F/A-18 aircraft model p 867 A92-49128 p 874 A92-46810 [AIAA PAPER 92-3809] Microwave temperature profiler for clear air turbulence Ignition delays, heats of combustion, and reaction rates Integrating aerodynamics and structures in the minimum INASA-CASE-NPO-18115-1-CUI p 916 N92-29148 weight design of a supersonic transport wing of aluminum alkyl derivatives used as ignition and [NASA-TM-107586] combustion enhancers for supersonic combustors Sensor fault detection on board an aircraft with observer p 850 N92-28435 [AIAA PAPER 92-3841] p 894 A92-49134 and polynomial classifier Identification of aerodynamic models for maneuvering Compensating for manufacturing and life-cycle p 859 N92-29870 IDLR-FB-91-341 aircraft variations in aircraft engine control systems [NASA-CR-190444] p 852 N92-28720 AIRCRAFT LANDING p 868 A92-49139 [AIAA PAPER 92-3869] AIRCRAFT NOISE An aircraft landing accident caused by visually induced Steady and Transient Performance Prediction of Gas Basic experiments on the directivity of the sound spatial disorientation p 834 A92-44993 Turbine Engines radiation emitted by a turboshaft engine Simulation of triple simultaneous parallel ILS p 868 N92-28458 [AGARD-LS-183] [ONERA, TP NO. 1992-36] p 926 A92-48597 p 880 A92-45025 Practical considerations in designing the engine cycle Research and studies on quiet helicopters Thrust laws for microburst wind shear penetration p 869 N92-28460 [ONERA, TP NO. 1992-59] p 926 A92-48618 p 873 A92-46750 Steady and transient performance calculation method Operational noise data for OH-58D Army helicopters Mathematical modeling of the effect of windshear on [AD-A2468221 for prediction, analysis, and identification p 926 N92-28292 p 875 A92-47784 p 869 N92-28461 the dynamics of a landing aircraft Boundary layer induced noise in aircraft Aircraft ship operations Inlet distortion effects in aircraft propulsion system |CUED/A-ÁERO/TR-18| p 927 N92-29201 [AGARD-AR-312] p 850 N92-28468 integration p 869 N92-28464 AIRCRAFT PARTS

S-76B certification for vertical take-off and landing

p 852 N92-28714

perations from confined areas

INLR-TP-90286-UT

Engine performance and health monitoring models using

p 870 N92-28467

steady state and transient prediction methods

p 900 A92-47412

p 848 A92-47664

Tooling for C-17 composite parts

on the body of an aircraft

Durability analysis for a main bulkhead subjected to load

AIRCRAFT PERFORMANCE SUBJECT INDEX

Economic life analysis for replacing components Safety in the sky - Designing bomb-resistant baggage AIRFIELD SURFACE MOVEMENTS p 785 A92-47670 p 836 A92-47775 Real-time control tower simulation for evaluation of containers A sensitivity analysis on component reliability from airport surface traffic automation p 879 A92-44976 Maintaining the safety of an aging fleet of aircraft p 837 N92-30108 AIRFOIL OSCILLATIONS fatique life computations n 908 N92-28425 140-42474301 Status of the FAA flight loads monitoring program Numerical simulations of separated flows around AIRCRAFT PERFORMANCE oscillating airfoil for dynamic stall phenomena p 914 N92-30113 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 [SAE PAPER 911991] p 788 A92-45393 Damage tolerance for commuter aircraft p 914 N92-30114 Experimental investigation of the flowfield of an oscillating airfoil Federal Aviation Administration aging aircraft Jet-powered V/STOL aircraft - Lessons learned [AIAA PAPER 92-2622] p 793 A92-45494 nondestructive inspection research plan p 841 A92-45304 p 914 N92-30116 Airfoil pressure measurements during oblique shock ASTOVL flexibility in the 21st century wave-vortex interaction in a Mach 3 stream AIRCRAFT STABILITY p 783 A92-45309 p 795 [AIAA PAPER 92-2631] An acrobatic airship 'Acrostat' Spatial and temporal adaptive procedures for the A progress report on ASTOVL control concept studies | SAE PAPER 911994| p 843 A92-45396 under the VAAC programme p 871 A92-45319

The experimental and computational study of jet Computational aspects of helicopter trim analysis and damping levels from Floquet theory p 875 A92-46933 unsteady aerodynamic analysis of airfoils using unstructured meshes p 875 A92-46933 impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 p 800 A92-45540 Analysis of the VISTA longitudinal simulation capability I AIAA PAPER 92-26941 performance p 876 A92-48488 Time accurate computation of unsteady transonic flows for a cruise flight condition Optimization of constant altitude-constant airspeed flight AIRCRAFT STRUCTURES around an airfoil with oscillating flap on dynamic grid p 845 A92-46815 p 805 A92-45567 of turbojet aircraft International Congress on Recent Developments in Air-[AIAA PAPER 92-2733] A numerical study of control surface buzz using Study on two variable control plan for twin spool turbojet and Structure-Borne Sound and Vibration, Auburn University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2 computational fluid dynamic methods p 862 A92-47697 Naval aircraft/engine mission payoff analyses [AIAA PAPER 92-3473] p 865 AS p 806 A92-45578 p 924 A92-45876 [AIAA PAPER 92-2654] p 865 A92-49019 Nonuniform motion of leading-edge vortex breakdown The relationship between mode localization and energy Effects of cockpit lateral stick characteristics on handling on ramp pitching delta wings p 808 A92-45828 transmission parameters in the vibration of coupled qualities and pilot dynamics p 925 A92-45921 Self-induced roll oscillations low-aspect-ratio structures INASA-CR-44431 p 878 N92-28584 Strength evaluation and safety of machine/structure. III rectangular wings p 874 A92-46802 The 1991 International Conference on Aging Aircraft and Numerical solutions of unsteady oscillating flows past · Case examples on strength and safety evaluation of an airfoil Structural Airworthiness machine/structure 3.2 aircraft (airframe) [AIAA PAPER 92-3212] p 912 N92-30106 p 882 A92-47303 INASA-CP-31601 p 825 A92-48817 Performance of fuselage pressure structure AIRFOIL PROFILES Low VOC primer for structural bonding --- volatile organic p 913 N92-30109 p 892 A92-47338 Measurements of the velocity and vorticity fields around compound AIRCRAFT PILOTS Design and use of aramid fiber in aircraft structures a pitching airfoil The development of a real time visual flight simulator p 784 A92-47407 1AIAA PÄPER 92-26261 p 794 A92-45498 for tactical operations research and measurement Resin transfer molding of a complex composite aircraft Application of an unstructured Navier-Stokes solver to p 880 A92-45027 p 784 A92-47410 p 900 A92-47412 multi-element airfoils operating at transonic maneuver A training program for airline line instructors Tooling for C-17 composite parts p 835 A92-45044 [AIAA PAPER 92-2638] Use of adhesive bonded attachments for a composite p 796 A92-45507 Aircraft spoiler effects under wind shear p 785 A92-47414 Empirical foundations and sensitivity testing - Is it enough aircraft fuel tank p 835 A92-45054 [AIAA PAPER 92-2642] p 796 A92-45509 Research of environmental spectrum for aircraft Knowledge-sensitive task manipulation - Acquiring p 785 A92-47655 Multi-point inverse design of an infinite cascade of structure airfoits knowledge from pilots flying a motion-based flight Optimal maintenance program of damage tolerance ructure p 785 A92-47660 [AIAA PAPER 92-2650] p 916 A92-45064 p 797 A92-45517 structure Separation control on high multi-element airfoils Mandatory psychological testing of pilots as a Sonic fatigue analysis and anti-sonic fatigue design of Reynolds number requirement for licensing in Norway? aircraft structure p 848 A92-47666 p 835 A92-45081 [AIAA PAPER 92-2636] A failure analysis for landing gear structural system p 849 A92-47667 Use of a commercially available flight simulator during aircrew performance testing Temporal adaptive Euler/Navier-Stokes algorithm involving unstructured dynamic meshes Integrated Design Analysis and Optimisation of Aircraft [AD-A245922] p 883 N92-28407 p 812 A92-46887 Structures Aircraft simulation and pilot proficiency: From surrogate ying towards effective training p 884 N92-28532 [AGARD-LS-186] p 851 N92-28469 Analysis of motion of airfoil flying over wavy-wall surface flting surface method) p 818 A92-47100 flying towards effective training (lifting surface method) Practical architecture of design optimisation software for The use of a dedicated testbed to evaluate simulator aircraft structures taking the MBB-Lagrange code as an The design and testing of an airfoil with hybrid laminar p 851 N92-28471 p 884 N92-28533 training effectiveness flow control AIRCRAFT POWER SUPPLIES [ONERA, TP NO. 1992-22] p 822 A92-48585 Structural optimization of aircraft p 851 N92-28472 Electric power generating system for the Boeing 777 AIRFOILS Multidisciplinary design and optimization p 851 N92-28473 Computational evaluation of an airfoil with a Gurney airolane [AGARD-PAPER-2] [SAE PAPER 912050] p 861 A92-45434 Paint removal using cryogenic processes Auxiliary power units for current and future aircraft [SAE PAPER 912059] p 862 A92-45 [AD-A247668] p 895 N92-28912 [AIAA PAPER 92-2708] p 802 A92-45550 p 862 A92-45441 Compressible Navier-Stokes solutions for a suction Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 An artificial intelligence approach for the verification of boundary control airfoil requirements for aircraft electrical power systems The 1991 International Conference on Aging Aircraft and AIAA PAPER 92-2710 p 802 A92-45551 p 863 A92-48481 Active control of vortex structures in a separating flow Structural Airworthiness [NASA-CP-3160] AIRCRAFT PRODUCTION over an airfoil p 912 N92-30106 Assembling the future AIRCRAFT RELIABILITY p 783 A92-44895 [AIAA PAPER 92-2728] p 804 A92-45563 Structural integrity of future aging airplanes p 913 N92-30107 Visualization of stopping flow over airfoils [AIAA PAPER 92-2730] The fatigue scatter factors and reduction factors in the p 804 A92-45564 Maintaining the safety of an aging fleet of aircraft Prediction of the viscous transonic aerodynamic design of aircraft and helicopter's structural lives p 837 N92-30108 performance of supercritical aerofoil sections p 843 A92-45387 ISAE PAPER 9119841 Performance of fuselage pressure structure A sensitivity analysis on component reliability from [AIAA PAPER 92-2653] p 805 A92-45569 p 913 N92-30109 A compact higher order Euler solver for unstructured grids with curved boundaries fatigue life computations Fracture mechanics research at NASA related to the p 908 N92-28425 IAD-A2474301 aging commercial transport fleet p 913 N92-30110 p 807 A92-45590 The 1991 International Conference on Aging Aircraft and Preliminary results on the fracture analysis of multi-site AIAA PAPER 92-2696 Structural Airworthiness cracking of lap joints in aircraft skins An unstructured approach to the design of [NASA-CP-3160] p 912 N92-30106 multiple-element airfoils p 913 N92-30111 Structural integrity of future aging airplanes [AIAA PAPER 92-2709] p 807 A92-45592 Current DOT research on the effect of multiple site n 913 N92-30107 damage on structural integrity Calculation of potential flow around airfoils using a screte vortex method p 808 A92-45827 p 913 N92-30112 Performance of fuselage pressure structure p 914 N92-30114 A manufact discrete vortex method Damage tolerance for commuter aircraft p 913 N92-30109 Time-average loading on a two dimensional airfoil in a Current DOT research on the effect of multiple site large amplitude motion p 811 A92-46805 Inspection of aging aircraft: damage on structural integrity p 913 N92-30112 Advanced pneumatic impulse ice protection system o 914 N92-30117 perspective Federal Aviation Administration aging (PIIP) for aircraft p 845 A92-46807 NDE research efforts at the FAA Center for Aviation nondestructive inspection research plan Systems Reliability p 914 N92-30119 Effect of model cooling on periodic transonic flow p 914 N92-30116

NDE research efforts at the FAA Center for Aviation Aging aircraft NDI Development and Demonstration p 813 A92-46900 (AANC): An overview Experimental investigation of the parallel vortex-airfoil nondestructive p 914 N92-30119 Systems Reliability inspection interaction at transonic speeds p 813 A92-46901 p 915 N92-30120 Survey of French activities concerning structural Unstructured and adaptive mesh generation for high Nondestructive inspection perspectives p 838 N92-30130 p 915 N92-30121 airworthiness and aging aircraft Reynolds number viscous flows p 816 A92-47042 Transport Canada aging aircraft activities Anisotropic control of mesh generation based upon a Current and future developments in civil aircraft p 838 N92-30131 p 918 A92-47043 non-destructive evaluation from an operator's point of Voronoi type method AIRCRAFT SAFFTY Adaptive parallel meshes with complex geometry p 918 A92-47050 p 787 N92-30122 view Stop, look and learn from accident investigation Nonlinear analyses of composite aerospace structures p 834 generation A92-44996 Multi-block grid in sonic fatigue [NASA-CR-190565] around Wing leading edge design with composites to meet bird wing-body-engine-pylon configurations p 854 N92-30209 strike requirements p 848 A92-47404 p 817 A92-47060 AIRCRAFT WAKES Internationalization of telemetry systems Viscous effects on a vortex wake in ground effect 3-D numerical grid generation for the transonic flow [NASA-CR-190400] analysis about multi-bodies p 920 A92-47535 p 907 N92-28361 p 817 A92-47061

SUBJECT INDEX APPROACH CONTROL

Orthogonal grids for multiple airfoils Interface of an uncoupled boundary layer algorithm with Unsteady pressure and load measurements on an p 818 A92-47096 an inviscid core flow algorithm for unsteady supersonic F/A-18 vertical fin at high-angle-of-attack [AIAA PAPER 92-2675] p 798 A92-45529 The numerical simulation of compressible flow around I AIAA PAPER 92-30831 p 823 A92-48730 p 818 A92-47686 an airfoil at high angle of attack Active control of vortex structures in a separating flow Fundamentals of structural optimisation Airfoil wake and linear theory gust response including over an airfoil p 851 N92-28470 [AIAA PAPER 92-2728] p 804 A92-45563 sub and superresonant flow conditions p 823 A92-48724 Wave drag determination in the transonic full-potential flow code MATRICS Visualization of stopping flow over airfoils [AIAA PAPER 92-3074] p 804 A92-45564 Flexible manufacturing in repair of gas turbine engine [AIAA PAPER 92-2730] [NLR-TP-90062-U] p 828 N92-28709 Experimental investigation of vortex dynamics on delta components p 786 A92-49049 [AIAA PAPER 92-3524] A rotorcraft flight database for validation of vision-based p 804 A92-45565 ranging algorithms Experimental and computational ice shapes and [AIAA PAPER 92-2731] [NASA-TM-103906] Full-scale high angle-of-attack tests of an F/A-18 [AIAA PAPER 92-2676] p 806 A92-4 resulting drag increase for a NACA 0012 airfoil p 841 N92-29103 p 828 N92-28674 Aerodynamic design optimization using sensitivity analysis and computational fluid dynamics [NASA-TM-105743] p 806 A92-45584 Results of a low power ice protection system test and Measurements of the unsteady vortex flow over a NASA-CASE-LAR-14815-1-CU p 910 N92-29830 a new method of imaging data analysis wing-body at angle of attack p 828 N92-28696 ALIGNMENT [NASA-TM-105745] (AIAA PAPER 92-2729) p 808 A92-45598 Multi-channel fiber optic rotary joint for single-mode Study of the leading-edge vortex dynamics in the Flow over a twin-tailed aircraft at angle of attack, II p 810 A92-46781 using Duhamel's unsteady flow over an airfoil Temporal characteristics IAD-D0152731 p 927 N92-29095 [AD-A247532] p 829 N92-28865 Outflow boundary conditions ALL-WEATHER LANDING SYSTEMS Nonlinear normal and axial force indicial responses for equation n 813 A92-46913 Autonomous landing - Functional requirements Hypersonic plasma predictions at nonzero angle of a two dimensional airfoil p 840 A92-48470 [AD-A247196] p 830 N92-28888 ALTERNATING CURRENT p 925 A92-47028 [AIAA PAPER 92-3027] Fatigue in single crystal nickel superalloys Electromechanical systems with transient high power p 896 N92-29408 IAD-A2481901 The numerical simulation of compressible flow around response operating from a resonant AC link [NASA-TM-105716] p 870 p 818 A92-47686 Spatial and temporal adaptive procedures for the an airfoil at high angle of attack p 870 N92-28985 unsteady aerodynamic analysis of airfoils using Some exact and numerical results for plane steady ALTERNATING DIRECTION IMPLICIT METHODS unstructured meshes sheared flow of an incompressible inviscid fluid p 831 N92-29445 Navier-Stokes and Euler solutions for an unmanned [NASA-TM-107635] p 821 A92-48019 aerial vehicle Computation of three-dimensional effects on two An experimental investigation on aft bypass supersonic [AIAA PAPER 92-2609] p 792 A92-45483 inlet performance at high angle of attack and yaw dimensional wings An unfactored implicit scheme for 3D inviscid transonic p 862 A92-48268 [NASA-CR-190576] p 832 N92-29691 flows Active thermal isolation for temperature responsive Thrust vectoring characteristics of the F-18 high alpha [AIAA PAPER 92-2668] p 798 A92-45523 research vehicle at angles of attack from 0 to 70 deg ALTITUDE CONTROL [NASA-CASE-LAR-14612-1] p 911 N92-29954 [AIAA PAPER 92-3095] AIAA PAPER 92-3095 | p 877 A92-48737 Flow visualization studies of a sideslipping, Eliminating pilot-caused altitude deviations - A human Experimental investigation of the flowfield of an p 834 A92-45041 canard-configured X-31A-Like fighter aircraft model factors approach oscillating airfoil European studies to investigate the feasibility of using 1000 ft vertical separation minima above FL 290. Part 1: [NASA-TM-105675] p 833 N92-30182 [AD-A245940] p 829 N92-28883 AIRFRAME MATERIALS Nonlinear normal and axial force indicial responses for Overview of organisation, techniques employed, and Contribution of individual load cycles to crack growth a two dimensional airfoil p 891 A92-45236 under aircraft spectrum loading conclusions p 830 N92-28888 (AD-A247196) [NLR-TP-91062-U-PT-1] p 841 N92-29605 Reliability centered maintenance for metallic airframes Study of optical techniques for the Ames unitary wind ALUMINIDES based on a stochastic crack growth approach tunnels. Part 3: Angle of attack p 897 A92-45242 Axial alignment of short-fiber titanium aluminide [NASA-CR-190541] p 888 N92-29655 composites by directional solidification Buckling, postbuckling and crippling of thin walled ANGLES (GEOMETRY) composite airframe structures under compression p 892 A92-46838 Feasibility study of hypersonic clinometric **ALUMINUM** p 899 A92-46940 measurements at R3Ch ONERA-RSF-136/1865-AY-728-) Anodize and prime your aluminum without environmenta p 829 N92-28789 The effect of composite material allowable changes on p 892 A92-47340 VTOL airframe weights p 848 A92-47629 headaches ANGULAR VELOCITY AIRFRAMES Surface residual stress analysis of metals and alloys Nonlinear inversion flight control [AD-A248372] p 895 N92-28426 The large scale test control systems designed and built supermaneuverable aircraft p 873 A92-46751 by the Boeing Company to support the 757 and 767 major **ALUMINUM ALLOYS** Symptom of payload-induced flight instability Aluminides modified by palladium - Protection of new p 873 A92-46761 fatigue tests p 881 A92-45388 parts by local finishing [ONERA, TP NO. 1992-49] **ISAE PAPER 9119851** ANISOTROPIC MEDIA Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 Durability analysis for a main bulkhead subjected to load p 893 A92-48610 on the body of an aircraft p 848 A92-47664 Surface residual stress analysis of metals and alloys p 895 N92-28426 Thermal QNDE detection of airframe disbonds [AD-A248372] ANISOTROPIC SHELLS p 914 N92-30118 Dynamic analysis of rotor flex-structure based on Tensile and interlaminar properties of GLARE (trade **AIRLINE OPERATIONS** nonlinear anisotropic shell models p 899 A92-46946 name) laminates Airline deregulation - Impact on human factors Sensitivity of tire response to variations in material and [AD-A2501881 p 895 N92-28921 p 834 A92-44999 geometric parameters p 900 A92-47128 Short cracks and durability analysis of the Fokker 100 A training program for airline line instructors ANISOTROPY wing/fuselage structure p 835 A92-45044 Anisotropic control of mesh generation based upon a INLR-TP-90336-U1 p 910 N92-29603 Industrial practice in aeronautical maintenance Voronoi type method p 918 A92-47043 **ALUMINUM COMPOUNDS** p 786 A92-47774 ANNULAR FLOW Ignition delays, heats of combustion, and reaction rates European studies to investigate the feasibility of using Laser anemometer measurements and computations in of aluminum alkyl derivatives used as ignition and 1000 ft vertical separation minima above FL 290. Part 1: an annular cascade of high turning core turbine vanes combustion enhancers for supersonic combustors [NASA-TP-3252] p 830 N92-28980 Overview of organisation, techniques employed, and p 894 A92-49134 IAIAA PAPER 92-3841 I conclusions ANNULAR NOZZLES **ANALOG CIRCUITS** [NLR-TP-91062-U-PT-1] p 841 N92-29605 The enhancement of mixing in high-speed heated jets What is an ASIC? p 859 N92-28377 Structural integrity of future aging airplanes using a counterflowing nozzle ANGLE OF ATTACK p 913 N92-30107 p 825 A92-48857 | AIAA PAPER 92-3262 | Update of the X-29 high-angle-of-attack program ANODIC COATINGS Communication: An important element of maintenance (SAE PAPER 912006) p 783 A92-45407 p 838 N92-30124 Anodize and prime your aluminum without environmental AIRPORT PLANNING Numerical investigation into high-angle-of-attack headaches p 892 A92-47340 parallel ILS Simulation of triple simultaneous Non-chromated anodize process for corrosion leading-edge vortex flow approaches p 880 A92-45025 [AIAA PAPER 92-2600] p 791 A92-45477 resistance and adhesive bonding p 892 A92-47341 AIRPORT SECURITY ANTIICING ADDITIVES Effect of canard deflection on close-coupled Airport X-ray screening technology becomes a viable Microbiological spoilage of aviation turbine fuel. II -Evaluation of a suitable biocide p 891 A92-45600 canard-wing-body aerodynamics explosives detector p 836 A92-47925 p 891 A92-45600 IAIAA PAPER 92-26021 p 792 A92-45479 AIRPORTS APOLLO PROJECT The effects of nozzle exit geometry on forebody vortex Real-time control tower simulation for evaluation of NASA engineers and the age of Apollo [NASA-SP-4104] p 93 control using blowing p 879 A92-44976 airport surface traffic automation p 929 N92-28344 [AIAA PAPER 92-2603] p 792 A92-45480 Putting the control back in air traffic control - An APPLICATION SPECIFIC INTEGRATED CIRCUITS High speed aerodynamics of upper surface blowing enhanced Universal Development Simulation System Applications of ASICs to avionics aircraft configurations p 916 A92-44982 [AGARD-AG-329] p 859 N92-28376 [AIAA PAPER 92-2611] p 793 A92-45485 AIRSHIPS What is an ASIC? p 859 N92-28377 Coupled numerical simulation of the external and engine An acrobatic airship 'Acrostat' A radar signal processing ASIC and a VME interface inlet flows for the F-18 at large incidence [SAE PAPER 911994] p 843 A92-45396 p 859 N92-28380 circuit p 793 A92-45493 [AIAA PAPER 92-2621] ALGORITHMS APPROACH Experimental investigation of the flowfield of an An unstructured mesh generation algorithm for A re-analysis of the causes of Boeing 727 'black hole three-dimensional aeronautical configurations oscillating airfoil p 833 A92-44985 landing' crashes [AIAA PAPER 92-2622] p 793 A92-45494 p 918 A92-47053 Effective cueing during approach and touchdown: Vortex trapping on a 60 degree delta wing A fast, uncoupled, compressible, two-dimensional, Comparison with flight APPROACH CONTROL p 886 N92-28552 [AIAA PAPER 92-2639] p 796 A92-45508 unsteady boundary layer algorithm with separation for engine inlets Aircraft spoiler effects under wind shear Approach guidance in a downburst

[AIAA PAPER 92-3082]

p 823 A92-48729

[AIAA PAPER 92-2642]

p 796 A92-45509

p 873 A92-46741

APPROXIMATION SUBJECT INDEX

Robust discrete controller design for an unmanned APPROXIMATION BAGGAGE Taylor series approximation of geometric shape variation research vehicle (URV) using discrete quantitative Safety in the sky - Designing bomb-resistant baggage for the Euler equations p 899 A92-46916 n 877 A92-48495 p 836 A92-47775 feedback theory containers Approximate analysis for failure probability of structural AUTOMATIC TEST EQUIPMENT BALL BEARINGS p 901 A92-47671 Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 The application of multimedia expert systems to the ARAMID FIBER COMPOSITES depot level maintenance environment Design and use of aramid fiber in aircraft structures Rotor support for the STME oxygen turbopump p 922 A92-48557 p 784 A92-47407 | AIAA PAPER 92-3282 | p 904 A92-48872 Developing intelligent automatic test equipment ARCHITECTURE (COMPUTERS) BALLOON FLIGHT p 922 A92-48569 Future directions in computing and CFD Oscillations of balloon-flight altitude **AUTONOMOUS NAVIGATION** p 917 A92-45489 I AIAA PAPER 92-2734 I p 836 A92-46660 Autonomous landing - Functional requirements A high performance general purpose processing element BASE FLOW p 840 A92-48470 p 920 A92-48440 Calculation of high speed base flows for avionic applications A rotorcraft flight database for validation of vision-based p 799 A92-45531 | AIAA PAPER 92-2679 | Global memory in the Pave Pace architecture ranging algorithms (NASA-TM-103906) p 920 A92-48447 BEARINGS p 841 N92-29103 Application of VME-technology on an airborne data link Dynamics of a split torque helicopter transmission **AUTOREGRESSIVE PROCESSES** 1NASA-TM-1056811 p 910 N92-29136 processor unit [NLR-MP-88040-U] Preliminary study of algorithm for real-time flutter Bearing servicing tool [NASA-CASE-MSC-21881-1] p 841 N92-29615 monitorina ARROW WINGS p 912 N92-30082 |SAE PAPER 912001| p 897 A92-45403 Exploratory investigation of a spanwise blowing concept BEECHCRAFT AIRCRAFT **AUXILIARY POWER SOURCES** for tip-stall control on cranked-arrow wings Resin transfer molding of a complex composite aircraft Auxiliary power units for current and future aircraft p 806 A92-45576 I AIAA PAPER 92-26371 p 784 A92-47410 [SAE PAPER 912059] p 862 A92-45441 BELL AIRCRAFT ARTIFICIAL INTELLIGENCE Space Shuttle Orbiter auxiliary power unit status
[SAE PAPER 912060] p 889 A92-An evaluation of IFR approach techniques: Generic Airport X-ray screening technology becomes a viable p 889 A92-45442 p 836 A92-47925 explosives detector helicopter simulation compared with actual flight AVIATION METEOROLOGY p 886 N92-28550 An artificial intelligence approach for the verification of Thrust laws for microburst wind shear penetration BEND TESTS requirements for aircraft electrical power systems p 873 A92-46750 p 863 A92-48481 Tensile and interlaminar properties of GLARE (trade Remote measurements of supercooled integrated liquid name) laminates Developing intelligent automatic test equipment water during WISP/FAA aircraft icing program p 922 A92-48569 (AD-A250188) p 895 N92-28921 p 915 A92-46788 artificial intelligence BINARY DATA Improving designer productivity ---**AVIATION PSYCHOLOGY** p 854 N92-29417 Binary optical filters for scale invariant pattern recognition [NASA-TM-103929] The development of an intelligent human factors data ASSEMBLING base as an aid for the investigation of aircraft accidents [NASA-TM-103902] Assembling the future p 783 A92-44895 p 853 N92-28910 p 928 A92-44994 BIRD-AIRCRAFT COLLISIONS ASSESSMENTS AVIONICS Structural risk assessment in the Israel Air Force for Avionics flight systems for the 21st century

SAE PAPER 912033] p 784 A92-45421 Wing leading edge design with composites to meet bird p 836 A92-46779 fleet management strike requirements p 848 A92-47404 [SAE PAPER 912033] ASYMPTOTIC METHODS **BLADE SLAP NOISE** Through the looking glass --- effectiveness of electronic Noise of two high-speed model counter-rotation The subsonic and transonic flow around the leading edge p 856 A92-46449 flight instrument systems propellers at takeoff/approach conditions of a thin airfoil with a parabolic nose Modular avionics - A commercial perspective p 797 A92-45516 p 925 A92-46799 [AIAA PAPER 92-2649] p 858 A92-48427 RTOK elimination with TSMM --- Rerurn Tested OK ATMOSPHERIC CIRCULATION Influence of geometrical parameters on helicopter rotor high speed impulsive noise [ONERA, TP NO. 1992-40] Airdata calibration techniques measuring reproduction using time stress measurement module atmospheric wind profiles p 856 A92-46792 p 926 A92-48601 p 902 A92-48446 ATMOSPHERIC ENTRY BLADE TIPS Liquid flow-through cooling for avionics applications A parametric analysis of radiative structure in aerobrake The use of optical sensors and signal processing gas p 902 A92-48448 shock lavers turbine engines p 856 A92-46247 Rapid systems integration of navigation avionics p 816 A92-46985 Experimental and numerical study of flow around [AIAA PAPER 92-2970] p 858 A92-48473 helicopter rotor blade tips
BLADE-VORTEX INTERACTION p 814 A92-46948 Decoupled predictions of radiative heating in air using Systems simulation of an advanced avionics COMSEC a particle simulation method p 921 A92-48485 p 816 A92-46986 [AIAA PAPER 92-2971] Boundary-layer measurements during a parallel Applying advanced digital simulation techniques in Gridding strategies and associated results for winged http yehicles p 918 A92-47051 blade-vortex interaction designing fault tolerant systems p 921 A92-48489 I AIAA PAPER 92-26231 p 794 A92-45495 entry vehicles Avionics software reusability observations and Computation of 3-D hypersonic flows in chemical Experimental investigation of the parallel vortex-airfoil recommendations p 921 A92-48502 non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A p 813 A92-46901 interaction at transonic speeds Expert Avionics Code Modification p 820 A92-47858 Active control of blade vortex interaction p 921 A92-48513 ATMOSPHERIC MODELS p 814 A92-46944 Using design of experiments to improve product and On the optimization of windshear warning and guidance Experimental and numerical study of flow around elicopter rotor blade tips p 814 A92-46948 process integrity
Applications of ASICs to avionics p 928 A92-48555 helicopter rotor blade tips systems Eulerian/Lagrangian | NLR-TP-90196-U| method p 837 N92-29703 for [AGARD-AG-329] p 859 N92-28376 ATMOSPHERIC TURBULENCE p 814 A92-46952 blade/vortex impingement Applications of silicon hybrid multi-chip modules to Three-dimensional blade vortex interactions Selected models of aircraft navigation space p 859 N92-28379 p 815 A92-46953 p 839 A92-45373 AXIAL FLOW TURBINES Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions Response of helicopters to gusts Advanced CFD simulation and testing of compressor p 879 N92-28653 [NLR-TP-90159-U] blading in the multistage environment Atmospheric turbulence spectra and correlation p 815 A92-46957 [AIAA PAPER 92-3040] p 822 A92-48701 functions BLAST LOADS Establishing two-dimensional flow in a large-scale planar [NLR-TP-89217-U] p 915 N92-28689 Modular simulation of HEI fragments and blast turbine cascade ATOMIZERS [AIAA PAPER 92-3066] p 823 A92-48720 pressure The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine Investigation of three-dimensional flow field in a turbine IAD-A2482051 p 910 N92-29191 **BLOWDOWN WIND TUNNELS** including rotor/stator interaction. I - Design development combustor swirl cup Replacement of the NAL high pressure air storage and performance of the research facility LAIAA PAPER 92-32311 p 863 A92-48832 p 883 svstem A92-48908 [AIAA PAPER 92-3325] ATTACK AIRCRAFT p 888 N92-28835 Investigation of three-dimensional flow field in a turbine [NAL-TM-634] Aircraft route optimization using adaptive simulated including rotor/stator interaction. II - Three-dimensional Production of periodical Mach number variations in high annealing p 922 A
Computational icing analysis for aircraft inlets o 922 A92-48565 subsonic flow in a blow down wind tunnel, and its influence flow field at the exit of the nozzle | AIAA PAPER 92-3326 | p 826 A92-48909 on profile measurements p 836 A92-48793 | AIAA PAPER 92-3178 | **AXISYMMETRIC BODIES** [ETN-92-91492] p 833 N92-29889 ATTITUDE CONTROL Enhancements to viscous-shock-layer technique BLOWING Numerical analysis of RCS jet in hypersonic flights p 820 A92-47873 [AIAA PAPER 92-2897] The effects of nozzle exit geometry on forebody vortex [SAE PAPER 912063] p 791 A92-45445 control using blowing control Nonlinear inversion flight for TAIAA PAPER 92-2603 I p 792 A92-45480 В supermaneuverable aircraft A92-46751 p 873 **BLUNT BODIES** The propulsive-only flight control problem p 876 A92-48487 Shock interaction induced by **B-1 AIRCRAFT** hemisphere-cylinders **AUTOMATIC CONTROL** B-1B excels in conventional role p 786 A92-47971 [SAE PAPER 912043] p 790 A92-45427 A new milestone in automatic aircraft control - Fly-by-light BACKWARD FACING STEPS Decoupled predictions of radiative heating in air using systems transmit commands optoelectronically Predictions of a turbulent backward-facing-step flow with a particle simulation method p 784 A92-45699 a cubic pressure-strain model [AIAA PAPER 92-2971] p 796 A92-45514 p 816 A92-46986 **AUTOMATIC FLIGHT CONTROL** [AIAA PAPER 92-2647] LDA measurements in a Mach 2 flow over a rearward Integrated flight control systems - Architectural Second-order shock-expansion theory extended to considerations for future aircraft concepts include real gas effects [AD-A247191] facing step with staged transverse injection p 872 A92-45322 p 800 A92-45539 [AIAA PAPER 92-2692] p 831 N92-29539 A study of the flammability limit of the backward facing **BLUNT LEADING EDGES** Comparison of six robustness tests evaluating missile step flow combustion Aerodynamically blunt and sharp bodies autopilot robustness to uncertain aerodynamics p 895 A92-49136 p 873 A92-46737 [AIAA PAPER 92-3846] | AIAA PAPER 92-2727 | p 808 A92-45597

Concepts for the stability analysis of NLF-experiments

Simplified linear stability transition prediction method for

p 801 A92-45548

p 812 A92-46883

on swept wings

IAIAA PAPER 92-27061

separated boundary layers

BODIES OF REVOLUTION Development and validation of a characteristic boundary On the measurement of subsonic flow around an condition for a cell-centered Euler method p 828 N92-28692 INLR-TP-90144-UI appended body of revolution at cryogenic conditions in p 880 A92-45265 Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement Measurements of the unsteady vortex flow over a p 908 N92-28712 INLR-TP-90134-UI ving-body at angle of attack Evaluation of measured-boundary-condition methods for p 808 A92-45598 [AIAA PAPER 92-2729] 3D subsonic wall interference Second-order shock-expansion theory extended to [NLR-TR-88072-U] p 832 N92-29884 include real gas effects **BOUNDARY ELEMENT METHOD** [AD-A247191] p 831 N92-29539 Hyperbolic grid generation with BEM source terms **BODY-WING AND TAIL CONFIGURATIONS** [NLR-TP-90334-U] p 923 N92-28635 Single block mesh generation for a fuselage plus two fiting surfaces p 817 A92-47054 Nonlinear analyses of composite aerospace structures lifting surfaces in sonic fatigue [NASA-CR-190565] **BODY-WING CONFIGURATIONS** p.854 N92-30209 Effect of canard deflection on close-coupled **BOUNDARY INTEGRAL METHOD** canard-wing-body aerodynamics [AIAA PAPER 92-2602] A new integral equation for potential compressible p 792 A92-45479 aerodynamics of rotors in forward flight Three-dimensional orthogonal-to-surface structured grid p 815 A92-46958 generation with transonic Navier-Stokes flow solutions for BOUNDARY LAYER CONTROL a commercial transport configuration Aerodynamic development of boundary layer control p 793 A92-45490 [AIAA PAPER 92-2616] system for NAL QSTOL research aircraft 'ASKA' Practical design optimization wing/body of ISAE PAPER 9120101 p 843 A92-45410 configurations using the Euler equations Compressible Navier-Stokes solutions for a suction p 795 A92-45505 boundary control airfoil
[AIAA PAPER 92-2710] I AIAA PAPER 92-26331 p 802 A92-45551 Transonic calculations for wings with deflected control An investigation of passive control methods for surfaces p 805 A92-45572 shock-induced separation at hypersonic speeds
[AIAA PAPER 92-2725] p 808 AS [AIAA PAPER 92-2617] p 808 A92-45596 Measurements of the unsteady vortex flow over a Gortler instability and supersonic quiet nozzle design wing-body at angle of attack [AIAA PAPER 92-2729] p 813 A92-46902 p 808 A92-45598 The design and testing of an airfoil with hybrid laminar grid generation Multi-block around flow control wing-body-engine-pylon configurations [ONERA, TP NO. 1992-22] p 817 A92-47060 p 822 A92-48585 Boundary layer induced noise in aircraft Analysis of results of an Euler-equation method applied CUED/A-AERO/TR-18) p 927 N92-29201 to leading-edge vortex flow [NLR-TP-90368-U] p 827 N92-28657 **BOUNDARY LAYER FLOW** A calculation of penetration of the jet issuing normally **BÒEING AIRCRAFT** Electric power generating system for the Boeing 777 into a cross flow across a wall boundary layer p 790 A92-45419 [SAE PAPER 912029] airplane p 861 A92-45434 Boundary-layer measurements during a parallel (SAE PAPER 912050) blade-vortex interaction Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-2623] p 794 A92-45495 Surface and flow field measurements in a symmetric p 905 A92-48937 [AIAA PAPER 92-3364] crossing shock wave/turbulent boundary layer flow Structural integrity of future aging airplanes p 806 A92-45574 p 913 N92-30107 [AIAA PAPER 92-2634] Discrete modes and continuous spectra in supersonic Performance of fuselage pressure structure p 809 A92-46264 p 913 N92-30109 boundary layers Computation of turbulent separated, unswept **BOEING 727 AIRCRAFT** p 813 A92-46897 compression ramp interactions A re-analysis of the causes of Boeing 727 'black hole p 833 A92-44985 Generation of efficient multiplock grids for Navier-Stokes landing' crashes Design and analysis of vortex generators on reengined p 919 A92-47081 Boeing 727-100QF center inlet S-duct by a reduced A new method for predicting the end wall boundary layers Navier-Stokes code and the blade force defects inside the passage of axial [AIAA PAPER 92-2700] p 800 A92-45542 p 819 A92-47691 compressor cascades **BOEING 747 AIRCRAFT** Interface of an uncoupled boundary layer algorithm with Crew transportation for the 1990s, I - Commercializing an inviscid core flow algorithm for unsteady supersonic manned flight with today's propulsion p 889 A92-46726 [AIAA PAPER 92-3083] p 823 A92-48730 BOLIDES Air ejector experiments using the two-dimensional Stability and inherent precision of two methods for supersonic cascade tunnel: Zero secondary flow solving motion and ablation equations for fireball-forming performance p 929 A92-46595 bodies in the earth atmosphere INAL-TM-6321 p 887 N92-28829 BOMBS (ORDNANCE) BOUNDARY LAYER SEPARATION Safety in the sky - Designing bomb-resistant baggage Separation control on high Reynolds number p 836 A92-47775 containers multi-element airfoils BOOMS (EQUIPMENT) IAIAA PAPER 92-26361 p 806 A92-45575 Effect of a nose-boom on forebody vortex flow An investigation of passive control methods for shock-induced separation at hypersonic speeds p 812 A92-46818 [AIAA PAPER 92-2725] p 808 A92-45596 Non-chromated anodize process for corrosion resistance and adhesive bonding p 892 A92-47341 Simplified linear stability transition prediction method for p 812 A92-46883 **BOUNDARY CONDITIONS** separated boundary layers Separation and vortex formation in turbulent flows [ONERA, TP NO. 1992-7] p 822 A92-48 Critical effects of downstream boundary conditions on p 822 A92-48579 vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 **BOUNDARY LAYER STABILITY** A new automatic grid generation environment for CFD Prediction of laminar boundary layer using cubic applications solines [AIAA PAPER 92-2720] p 803 A92-45558 [AIAA PAPER 92-2702] p 801 A92-45544 Viscous flow past a nacelle isolated and in proximity Effect of a bulge on the subharmonic instability of of a flat plate subsonic boundary layers p 898 A92-45833 [AIAA PAPER 92-2723] p 803 A92-45560 Effect of a fan of rarefaction waves on the development A compact higher order Euler solver for unstructured of disturbances in a supersonic boundary layer orids with curved boundaries p 809 A92-46519 [AIAA PAPER 92-2696] p 807 A92-45590 Gortler instability and supersonic quiet nozzle design Ritz vectors synthesis versus modal synthesis for p 813 A92-46902 fluid-structure interaction modeling p 898 A92-45885 The method of determinant equations in the applied The calculation of three-dimensional compressible boundary layer stability on swept wings theory of optimal systems - Systems with 'rigid' constraints p 818 A92-47684 and with fixed boundary conditions p 917 A92-46629
Outflow boundary conditions using Duhamel's **BOUNDARY LAYER TRANSITION** Outflow boundary conditions

p 813 A92-46913

p 822 A92-48705

Application of non-reflecting boundary conditions to

three-dimensional Euler equation calculations for thick

strut cascades [AIAA PAPER 92-3045]

Turbulent spot generation and growth rates in a transonic houndary layer IAD-A2502211 p 909 N92-29118 BOUNDARY LAYERS An adaptive grid method for computing the high speed 3D viscous flow about a re-entry vehicle [AIAA PAPER 92-2685] p p 799 A92-45534 Alleviation of side force on tangent-ogive forebodies using passive porosity [AIAA PAPER 92-2711] p 802 A92-45552 Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 Aerodynamic characteristics of hoar frost roughness p 808 A92-45829 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction [NASA-TP-3197] p 827 N92-28477 Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 A preliminary experimental investigation of tocal isotropy in high-Reynolds-number turbulence p 912 N92-30042 BOUNDARY LUBRICATION Lubricant evaluation and performance 2 p 895 N92-28398 **BOUNDARY VALUE PROBLEMS** Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement INI R-TP-90134-UI p 908 N92-28712 **BOW WAVES** interaction Shock induced bν hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 BRUSH SEALS Simple effective thickness model for circular brush seals [AIAA PAPER 92-3192] p 903 A92-48803 BUBBLES Laminar separation bubbles and airfoil design at low Reynolds numbers [AIAA PAPER 92-2735] p 797 A92-45515 BUCKLING Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 Numerical investigation of tail buffet on F-18 aircraft [AIAA PAPER 92-2673] p 798 A92-45528 Unsteady pressure and load measurements on an F/A-18 vertical fin at high-angle-of-attack [AIAA PAPER 92-2675] p 7 p 798 A92-45529 Flow over a twin-tailed aircraft at angle of attack. II -Temporal characteristics p 810 A92-46781 Statistical prediction of maximum buffet loads on the F/A-18 vertical fin p 811 A92-46816 Buffet test in the National Transonic Facility [NASA-CR-189595] p 888 N92-29352 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 BURNING RATE Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 BYPASS RATIO An experimental investigation on aft bypass supersonic inlet performance at high angle of attack and yaw p 862 A92-48268 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) p 867 A92-49120 [AIAA PAPER 92-3776] BYPASSES Conceptual study of separated core ultra high bypass [AIAA PAPER 92-3775] p 867 A92-49119 C (PROGRAMMING LANGUAGE) On-line performance evaluation of multiloop digital control systems C-130 AIRCRAFT

p 873 A92-46739

C-141 and C-130 power-by-wire flight control systems p 876 A92-48493 Life cycle costs of the C-130 electrical power system

upgrade LAD-A2467591 p 786 N92-28348 C-135 AIRCRAFT

Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416

C-141 AIRCRAFT C-141 AIRCRAFT C-141 and C-130 power-by-wire flight control systems Airdata calibration techniques atmospheric wind profiles Calculation of support interferences on the aerodynamic coefficients for a wind tunnel calibration model [ESA-TT-1247] CAMERAS Study of optical techniques for the Ames unitary wind tunnels. Part 3: Angle of attack [NASA-CR-190541] CANARD CONFIGURATIONS Effect of canard deflection canard-wing-body aerodynamics [AIAA PAPER 92-2602] Quantification of canard and wing interactions using spatial correlation velocimetry [AIAA PAPER 92-2687] Comment on 'Canard-wing interaction in unsteady supersonic flow CARBON DIOXIDE Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] CARBON FIBERS A field repair of advanced helicopter vertical fin structure **CARGO AIRCRAFT** Tooling for C-17 composite parts p 900 A92-47412 CARTESIAN COORDINATES A finite difference solution of the Euler equations on non-body-fitted Cartesian grids CASCADE FLOW Multi-point inverse design of an infinite cascade of airfoils [AIAA PAPER 92-2650] Effect of flow rate on loss mechanisms in a backswept centrifugal impeller The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades Experience with the Johnson-King turbulence model in a transonic turbine cascade flow solver Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] Application of non-reflecting boundary conditions to three-dimensional Euler equation calculations for thick strut cascades [AIAA PAPER 92-3045] Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades IAIAA PAPER 92-30731 Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] A turbulence model based on RNG for quasi-three-dimensional cascade flows --- renormalization group methods [AIAA PAPER 92-3312] A Navier-Stokes analysis of a controlled-diffusion compressor cascade at increasing inlet-flow angles [AIAA PAPER 92-3313] Explicit Navier-Stokes computation of turbomachinery [AD-A249284] Laser anemometer measurements and computations in

p 876 A92-48493 for measuring p 856 A92-46792 measuring p 830 N92-29159 p 888 N92-29655 on close-coupled p 792 A92-45479 p 807 A92-45588 p 812 A92-46820 p 892 A92-47835 p 785 A92-47417 p 818 A92-47153 p 797 A92-45517 p 897 A92-45606 p 899 A92-46825 p 819 A92-47691 p 821 A92-48207 p 822 A92-48702 p 822 A92-48705 p 823 A92-48720 p 823 A92-48723 p 824 A92-48800 p 825 A92-48898 p 825 A92-48899 p 909 N92-28879 an annular cascade of high turning core turbine vanes p 830 N92-28980 Development of a multigrid transonic potential flow code p 830 N92-29361

p 871 N92-29927

p 887 N92-28829

p 870 N92-28711

flows holes fiber

CAVITATION FLOW Laminar separation bubbles and airfoil design at low Revnolds numbers [AIAA PAPER 92-2735] CAVITY FLOW Numerical study on a supersonic open cavity flow with geometric modification of aft bulkhead [AIAA PAPER 92-2627] Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow --- to simulate electrical cables routed through Space Shuttle Solid Rocket Booster 1 A1A A PAPER 92-29491 CENTRIFUGAL COMPRESSORS Effect of flow rate on loss mechanisms in a backswept centrifugal impeller Magnetic bearing design and control optimization for a four-stage centrifugal compressor Active magnetic bearings give systems a lift CERAMICS testing the 1990's CHANNELS Examination of the main error factors with regards to secondary losses in compression and turbine cascades

Design and test of an Active Tip Clearance System for centrifugal compressors [AIAA PAPER 92-3189] p 863 A92-48801 Navier-Stokes investigation of a transonic centrifugal compressor stage using an algebraic Reynolds stress [AIAA PAPER 92-3311] p 825 A92-48897 Dynamic control of aerodynamic instabilities in gas p 870 N92-28466 turbine engines Explicit Navier-Stokes computation of turbomachinery p 909 N92-28879 [AD-A249284] A 4-spot time-of-flight anemometer for small centrifugal compressor velocity measurements p 909 N92-29105 INASA-TM-1057171 Explicit Navier-Stokes computation of turbomachinery [AD-A248458] p 911 N92-29933 CENTRIFUGAL FORCE Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92 45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines p 861 A92-45431 [SAE PAPER 912047] Study of grinding process and strength for ceramic heat insulated engine [SME PAPER MR91-177] p 897 A92-45260 CERTIFICATION Validation of simulation systems for aircraft acceptance p 852 N92-28531 The use of load enhancement factors in the certification of composite aircraft structures p 852 N92-28649 NLR-TP-90068-U1 S-76B certification for vertical take-off and landing operations from confined areas p 852 N92-28714 NI R-TP-90286-LII CESSNA AIRCRAFT Drop test: Cessna Golden Eagle 421B [DOT/FAA/CT-TN91/32] p.8 p 837 N92-28900 **CH-47 HELICOPTER** Rotorcraft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for [NASA-TM-103873] p 853 N92-28926 CHALLENGER (ORBITER) Performance of uncoated AFRSI blankets during multiple Space Shuttle flights INASA-TM-1038921 p 890 N92-29104 CHANNEL FLOW Segmental heat transfer in a pin fin channel with ejection p 900 A92-47267 Total losses in turbulent flows inside conical diffusers p 819 A92-47782 Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities p 894 A92-48986 [AIAA PAPER 92-3429] Multi-channel fiber optic rotary joint for single-mode [AD-D015273] p 927 N92-29095 Chaotic oscillation in helicopter blade stall response p 846 A92-46922 Chaotic dynamic behavior in a simplified rotor blade lag p 846 A92-46926 model CHARGE COUPLED DEVICES A high-performance LLLTV CCD camera for nighttime pilotage p 855 A92-46227 CHECKOUT Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 CHEMICAL REACTIONS Modeling of the reactant conversion rate in a turbulent p 829 N92-28820 shear flow

p 794 A92-45499

p 901 A92-47913

p 897 A92-45606

p 900 A92-47188

p 901 A92-48201

SUBJECT INDEX Effect of walls on the supersonic reacting mixing layer p 912 N92-30065 CHEMILUMINESCENCE Shock enhancement and control of hypersonic combustion (AD-A248558) n 896 N92-29580 CHIPS (ELECTRONICS) What is an ASIC?
CHIPS (MEMORY DEVICES) p 859 N92-28377 A high performance general purpose processing element for avionic applications p 920 A92-48440 CIRCULAR CONES Comparison of interferometric measurements with 3-D Euler computations for circular cones in supersonic flow p 800 A92-45538 I AIAA PAPER 92-2691 I CIRCULAR CYLINDERS induced bу hemisphere-cylinders ISAE PAPER 9120431 p 790 A92-45427 The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CIVIL AVIATION ICAO Flight Safety and Human Factors Programme p 835 A92-45055 HSCT off-design Effects of wing planform on aerodynamics --- High Speed Civil Transport p 844 A92-45501 [AIAA PAPER 92-2629] Industrial practice in aeronautical maintenance p 786 A92-47774 Safety in the sky - Designing bomb-resistant baggage ontainers p 836 A92-47775 containers Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Piloted Simulation Effectiveness IAGARD-CP-5131 p 786 N92-28522 Flight simulation and digital flight controls p 884 N92-28526 Validation of simulation systems for aircraft acceptance testing p 852 N92-28531 FAA aviation forecasts IAD-A2504121 p 837 N92-29182 European studies to investigate the feasibility of using 1000 ft vertical separation minima above FL 290. Part 1: Overview of organisation, techniques employed, and (NLR-TP-91062-U-PT-1) p 841 N92-29605 Current and future developments in civil aircraft non-destructive evaluation from an operator's point of p 787 N92-30122 Communication: An important element of maintenance p 838 N92-30124 and repair Ageing aircraft research in the Netherlands p 838 N92-30129 CLASSIFIERS Sensor fault detection on board an aircraft with observer and polynomial classifier IDLR-FB-91-341 p 859 N92-29870 CLEAR AIR TURBULENCE Microwave temperature profiler for clear air turbulence prediction [NASA-CASE-NPO-18115-1-CU] p 916 N92-29148 CLEARANCES The use of optical sensors and signal processing gas turbine engines p 856 A92-46247 Design and test of an Active Tip Clearance System for centrifugal compressors [AIAA PAPER 92-3189] p 863 A92-48801 Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating [NASA-TM-103925] p 852 N92-28721 COCKPIT SIMULATORS Transport delay measurements: Methodology and analysis for the F-16C combat engagement trainer, the display for advanced research and training, and the F-16A limited field of view [AD-A248519] p 888 N92-29505 COCKPITS Lessons learned about information management within the Pilot's Associate program p 916 A92-44909 Mode S data link pilot-system interface - A blessing in p 839 A92-44920 de skies or a beast of burden? Who or what saved the day? A comparison of traditional and glass cockpits p 833 A92-44931 Empirical foundations and sensitivity testing - Is it enough for the 90's? p 835 A92-45054 A340 handling, cockpit design improve on predecessor p 849 A92-47969 Use of a virtual cockpit for the development of a future transport aircraft p 886 N92-28547 Effects of cockpit lateral stick characteristics on handling

qualities and pilot dynamics

p 878 N92-28584

[NASA-CR-4443]

CASING

[NASA-TP-3252]

[NASA-CR-190480]

[ÉTN-92-91493]

performance

NAL-TM-6321

INLR-TP-90097-U]

CASCADE WIND TUNNELS

by variations of the blade picture ratio

Air ejector experiments using the two-dimensional

supersonic cascade tunnel: Zero secondary flow

Diffuser casing upgrade for an advanced turbofan

for cascades

Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions p 853 N92-28802 IAD-A245977 I COEFFICIENTS A semi empirical method for the analytical representation of stationary measured profile coefficients for applications of rotary wing aerodynamics n 832 N92-29741 IETN-92-914911 Bistatic scattering on a monostatic radar range p 849 Ā92-48408 Scale model test results of a multi-slotted vectoring 2DCD ejector nozzle p 864 A92-48859 [AIAA PAPER 92-3264] Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Transport delay measurements: Methodology and analysis for the F-16C combat engagement trainer, the display for advanced research and training, and the F-16A limited field of view p 888 N92-29505 LAD-A2485191 Combined load test apparatus for flat panels p 911 N92-30028 [NASA-CASE-LAR-14698-1] Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer p 894 A92-48848 [AIAA PAPER 92-3249] Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 A study of the flammability limit of the backward facing step flow combustion p 895 A92-49136 AIAA PAPER 92-3846 J Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems I AIAA PAPER 92-3246 p 904 A92-48845 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Mixing in the dome region of a staged gas turbine combustor [AIAA PAPER 92-3089] Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 An experimental investigation of high-aspect-ratio cooling passages [AIAA PAPER 92-3154] The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine combustor swirl cup [AIAA PAPER 92-3231] p 863 A92-48832 Numerical simulation of turbine 'hot spot' alleviation using film cooling p 904 A92-48896 [AIAA PAPER 92-3309] Measurement of scalar flowfield at exit of combustor sector using Raman diagnostics [AIAA PAPER 92-3350] p 894 A92-48927 A distributed vaporization time-lag model for gas turbine combustor dynamics (AIAA PAPER 92-3465) p.865 A92-49014 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 Prediction of gas turbine combustor flow by a finite

COHERENT RADAR COLD FLOW TESTS **COLLISION AVOIDANCE** COMBAT COMBINED STRESS **COMBUSTIBLE FLOW** COMBUSTION **COMBUSTION CHAMBERS** element code [AIAA PAPER 92-3469] p 906 A92-49016 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 Analytical design and demonstration of a low-cost expendable turbine engine combustor [AIAA PAPER 92-3754] p 867 A92-49112

An analysis of combustion studies in shock expansion

Applied analytical combustion/emissions research at the

An analysis of combustion studies in shock expansion

p 890 N92-29343

p 895 N92-28374

tunnels and reflected shock tunnels

tunnels and reflected shock tunnels

NASA Lewis Research Center

[NASA-TP-3224]

[NASA-TM-105731]

[NASA-TP-3224]

COMBUSTION CHEMISTRY

COMBUSTION CONTROL Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 COMBUSTION EFFICIENCY Measurement of scalar flowfield at exit of combustor sector using Raman diagnostics [AIAA PAPÉR 92-3350] p 894 A92-48927 A new vane swirler as applied to dual-inlet side-dump combustor p 906 A92-49085 [AIAA PAPER 92-3654] A study of the flammability limit of the backward facing step flow combustion I AIAA PAPER 92-38461 p 895 A92-49136 COMBUSTION PHYSICS Pulse jet one-way valve performance p 863 A92-48790 [AIAA PAPER 92-3169] A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014 Combustion of solid fueled ramiet, I [AIAA PAPER 92-3727] p 894 A92-49105 An analysis of combustion studies in shock expansion tunnels and reflected shock tunnels [NASA-TP-3224] p 895 N92-28374 COMMAND AND CONTROL Gulf Range Drone Control Upgrade System Mobile p 882 A92-47567 Control System COMMAND GUIDANCE Global Positioning System telecommand link p 839 A92-47566 COMMERCIAL AIRCRAFT EICAS in an integrated cockpit --- Engine Indication Crew Alerting System Avionics flight systems for the 21st century [SAE PAPER 912033] p 784 A92-45421 Aircraft Command in Emergency Situations (ACES) p 835 A92-45424 [SAE PAPER 912039] Airbus A319 - Completion of the standard fuselage p 848 A92-47591 Modular avionics - A commercial perspective p 858 A92-48427 Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs
[AD-A250390] p 854 N92-29180 FAA aviation forecasts LAD-A2504121 p 837 N92-29182 Structural integrity of future aging airplanes p 913 N92-30107 Fracture mechanics research at NASA related to the aging commercial transport fleet p 913 N92-30110 Status of the FAA flight loads monitoring program p 914 N92-30113 Nondestructive inspection perspectives p 915 N92-30121 COMMERCIAL SPACECRAFT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 COMMONALITY Common airborne instrumentation system (CAIS) --time-division multiplexed data acquisition system p 856 A92-47538 COMMUNICATING Communication: An important element of maintenance p 838 N92-30124 and repair **COMMUNICATION NETWORKS** Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 COMMUNICATION THEORY Improving the LAMP Mk 3 SH-60B HF communication system [AD-A245970] p 910 N92-29344 COMMUTER AIRCRAFT Damage tolerance for commuter aircraft p 914 N92-30114 COMPARISON Comparison of LDA and LTA applications for propeller tests in wind tunnels INLR-MP-88031-UI p 827 N92-28658 COMPLEX SYSTEMS Applying advanced digital simulation techniques in designing fault tolerant systems p 921 A92-48489 COMPONENT RELIABILITY Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 A sensitivity analysis on component reliability from fatigue life computations LAD-A2474301 p 908 N92-28425

Component performance requirements

static component reliability study

(DOT/FAA/CT-91/10)

Turbine aircraft engine operational trending and JT8D

p 869 N92-28462

p 870 N92-28686

COMPOSITE MATERIALS Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 Composites in manufacturing - Case studies [ISBN 0-87263-406-X1 p 784 A92-47403 The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 Structural optimization of aircraft p 851 N92-28472 Mathematical optimization: A powerful tool for aircraft p 851 N92-28474 The use of load enhancement factors in the certification of composite aircraft structures p 852 N92-28649 INLR-TP-90068-U1 COMPOSITE STRUCTURES An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades ISAÉ PAPER 9120481 p 861 A92-45432 Approach for analysis and design of composite rotor blades p 899 A92-46801 Filament winding of composite isogrid fusetage p 784 A92-47405 Design and test of aircraft aft fuselage structure using p 848 A92-47406 postbuckled shear panels Design and use of aramid fiber in aircraft structures p 784 A92-47407 Design of helicopter composite structures for crashworthiness p 848 A92-47408 Resin transfer molding of a complex composite aircraft p 784 A92-47410 structure p 900 A92-47412 Tooling for C-17 composite parts The role of nonmetallic fasteners in aircraft wings and other composite structures p 784 A92-47413 Use of adhesive bonded attachments for a composite p 785 A92-47414 aircraft fuel tank Advanced composite components in airline service p 785 A92-47416 status and repair A field repair of advanced helicopter vertical fin tructure p 785 A92-47417 structure Computed Tomography (CT) as a nondestructive test method used for composite helicopter components [MBB-UD-0603-91-PUB] p 910 N92p 910 N92-29873 Nonlinear analyses of composite aerospace structures in sonic fatigue [NASA-CR-190565] p 854 N92-30209 COMPRESSIBILITY Natural flow wing [NASA-CASE-LAR-14281-1] n 829 N92-28729 Turbulent spot generation and growth rates in a transonic boundary layer p 909 N92-29118 [AD-A250221] COMPRESSIBLE BOUNDARY LAYER The inviscid compressible Goertler problem in three-dimensional boundary layers p 809 A92-46441 The calculation of three-dimensional compressible boundary layer stability on swept wings p 818 A92-47684 A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for enaine inlets [AIAA PAPER 92-3082] p 823 A92-48729 Turbulent spot generation and growth rates in a transonic boundary layer p 909 N92-29118 Methods for direct simulation of transition in hypersonic p 912 N92-30064 boundary layers 2 COMPRESSIBLE FLOW Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations p 796 A92-45510 [AIAA PAPER 92-2643] Shock fitting with a finite volume approximation to the Euler equations [AIAA PAPER 92-2646] p 796 A92-45513 Effect of throat contouring on two-dimensional converging-diverging nozzles using URS method p 797 A92-45520 [AIAA PAPER 92-2659] Comparison of interferometric measurements with 3-D Euler computations for circular cones in supersonic flow p 800 A92-45538 [AIAA PAPER 92-2691] Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct [AIAA PAPER 92-2699] p 800 A92-45541 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Parallel computing strategies for block multigrid implicit p 812 A92-46894 solution of the Euler equations Computation of turbulent, separated, unswept compression ramp interactions p 813 A92-46897 A-11

A new integral equation for potential compressible aerodynamics of rotors in forward flight p 815 A92-46958 Unstructured and adaptive mesh generation for high Reynolds number viscous flows р 816 А92-47042 Anisotropic control of mesh generation based upon a oronoi type method p 918 A92-47043 Grid generation and compressible flow computations Voronoi type method about a high-speed civil transport configuration p 919 A92-47055 A finite difference solution of the Euler equations on non-body-fitted Cartesian grids p 818 A92-47153 The numerical simulation of compressible flow around an airfoil at high angle of attack p 818 A92-47686

Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860 Interface of an uncoupled boundary layer algorithm with an inviscid core flow algorithm for unsteady supersonic engine inlets [AIAA PAPER 92-3083] p 823 A92-48730 Experiments on the enhancement of compressible mixing via streamwise vorticity. I - Optical measurements [AIAĂ PAPER 92-3549] p 906 A92-49064 COMPRESSION LOADS Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 Natural flow wing [NASA-CASE-LAR-14281-1] p 829 N92-28729 Apparatus for elevated temperature compression or tension testing of specimens INASA-CASE-LAR-14775-1] p 912 N92-30099 COMPRESSION TESTS Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 **COMPRESSOR BLADES** Advanced CFD simulation and testing of compressor blading in the multistage environment [AIAA PAPER 92-3040] p 822 A92-48701 Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges p 824 A92-48800 [AIAA PAPER 92-3188] A Navier-Stokes analysis of a controlled-diffusion compressor cascade at increasing inlet-flow angles [AIAA PAPER 92-3313] p 825 A92-48899 Examination of the main error factors with regards to secondary losses in compression and turbine cascades by variations of the blade picture ratio p 871 N92-29927 [ETN-92-91493] COMPRESSOR EFFICIENCY Steady and transient performance calculation method for prediction, analysis, and identification p 869 N92-28461 COMPRESSORS Calculation of installation effects within performance p 869 N92-28465 computer programs COMPUTATION Calculation methods on equivalence ratio of multi-propellant for propulsion system p 893 A92-48269 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations p 828 N92-28660 INIR-TP-89126-U1 Second-order shock-expansion theory extended to include real gas effects [AD-A247191] p 831 N92-29539 COMPUTATIONAL FLUID DYNAMICS Swirt number effects on confined flows in a model of a dump combustor p 896 A92-45202 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 Computational aerodynamics - The next generation p 788 A92-45390 ISAE PAPER 9119881 The impact of CFD on the airplane design process -Today and tomorrow [SAE PAPER 911989] p 788 A92-45391 Computational aerodynamics in aircraft design Challenges and opportunities for Euler/Navier-Stokes methods [SAE PAPER 911990] p 788 A92-45392 Numerical simulations of separated flows around oscillating airfoil for dynamic stall phenomena [SAE PAPER 911991] p 788 A92-45393 Computational fluid dynamics applications in airplane cabin ventilation system design ISAE PAPER 9119921 p 788 A92-45394 Recent applications of the FNS zonal Method to complex ISAE PAPER 9120031 p 789 A92-45404

Numerical simulation of a supersonic jet impingement

p 789 A92-45412

A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer p 790 A92-45419 |SAE PAPER 912029| Numerical simulations of hypersonic real-gas flows over space vehicles p 791 A92-45429 [SAE PAPER 912045] AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pts. 1 & 2 p 791 A92-45476 Numerical investigation into high-angle-of-attack leading-edge vortex flow [AIAA PAPER 92-2600] p 791 A92-45477 Effect of canard deflection close-coupled canard-wing-body aerodynamics I AIAA PAPER 92-26021 p 792 A92-45479 Future directions in computing and CFD p 917 [AIAA PAPER 92-2734] A92-45489 The design of a system of codes for industrial calculations of flows around aircraft and other complex aerodynamic configurations [AIAA PAPER 92-2619] p 917 A92-45492 Practical design optimization of wing/body configurations using the Euler equations p 795 A92-45505 1AIAA PAPER 92-26331 Recent CFD applications on jet transport configurations [AIAA PAPER 92-2658] p 844 A92-45519 Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 A new approach for the calculation of transitional [AIAA PAPER 92-2669] p 798 A92-45524 LU-SGS implicit scheme for entry vehicle flow computation and comparison with aerodynamic data [AIAA PAPER 92-2671] p 798 A92-45526 Numerical investigation of tail buffet on F-18 aircraft [AIAA PAPER 92-2673] p 798 A92-45528 Calculation of high speed base flows p 799 A92-45531 [AIAA PAPER 92-2679] An adaptive grid method for computing the high speed 3D viscous flow about a re-entry vehicle [AIAA PAPER 92-2685] p p 799 A92-45534 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes IAIAA PAPER 92-26941 p 800 A92-45540 Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct [AIAA PAPER 92-2699] p 800 A92-45541 Surface grid generation in a parameter space [AIAA PAPER 92-2717] p 803 AS p 803 A92-45556 A new automatic grid generation environment for CFD applications [AIAA PAPER 92-2720] p 803 A92-45558 Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45568 Prediction of the viscous transonic aerodynamic performance of supercritical aerofoil sections [AIAA PAPER 92-2653] p 805 A92-45569 flows around a Computations of hypersonic three-dimensional concave/convex body [AIAA PAPER 92-2606] p 805 A92-45570 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter (AIÁA PAPER 92-2614) p 805 A92-45571 Transonic calculations for wings with deflected control | AIAA PAPER 92-2617 | p 805 A92-45572 Application of the Euler method EUFLEX to a fighter-type airplane configuration at transonic speed p 845 A92-45573 [AIAA PAPER 92-2620] A numerical study of control surface buzz using computational fluid dynamic methods [AIAA PAPER 92-2654] p 806 A92-45578 Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Comparison of two flux splitting schemes for calculation of ogive-cylinder at M = 3.5 and alpha = 18 deg [AIAA PAPER 92-2667] p 806 A92-45582 A fast, implicit unstructured-mesh Euler method p 917 A92-45589 [AIAA PAPER 92-2693] A compact higher order Euler solver for unstructured grids with curved boundaries [AIAA PAPER 92-2696] p 807 A92-45590

unstructured approach to

multiple-element airfoils

[AIAA PAPER 92-2709]

the design of

p 807 A92-45592

hypersonic aircraft [AIAA PAPER 92-2722] p 807 A92-45595 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 80 p 808 A92-45597 Eigenfunction analysis of turbulent mixing phenomena p 898 A92-45826 Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 Streamlines, vorticity lines, and vortices around p 808 A92-45845 three-dimensional bodies The inviscid compressible Goertler problem in tree-dimensional boundary layers p 809 A92-46441 three-dimensional boundary layers Smooth solutions for transonic gasdynamic equations Russian book HSBN 5-02-029345-81 p 809 A92-46626 Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 Predicted pressure distribution on a prop-fan blade through Euler analysis p 810 A92-46791 Design load predictions on a fighter-like aircraft wing p 811 A92-46797 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 Temporal adaptive Euler/Navier-Stokes algorithm involving unstructured dynamic meshes p 812 A92-46887 Joint computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental results p 812 A92-46890 computational/experimental aerodynamics Joint research on hypersonic vehicle. II - Computational p 812 A92-46891 using Duhamel's p 813 A92-46913 results Outflow boundary conditions equation Taylor series approximation of geometric shape variation p 899 A92-46916 for the Euler equations Experimental and numerical study of flow around opter rotor blade tips p 814 A92-46948
unified procedure for solving rotor flowfield, helicopter rotor blade tips performance and interference p 814 A92-46950 Efficient high-resolution rotor wake calculations using ow field reconstruction p 814 A92-46951 flow field reconstruction An Eulerian/Lagrangian method for computing lade/vortex impingement p 814 A92-46952 blade/vortex impingement Three-dimensional blade vortex interactions p 815 A92-46953 Experimental and computational studies of hovering rotor flows p 815 A92-46954 Numerical simulation of multizone two-dimensional transonic flows using the full Navier-Stokes equations p 815 A92-46955 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 A new integral equation for potential compressible aerodynamics of rotors in forward flight p 815 A92-46958 Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Simple diagnosis for the quality of generated grid ystems p 919 A92-47069 Patch-independent structured multiblock grids for CFD computations p 919 A92-47078 A geometry-integrated approach to multiblock grid p 919 A92-47083 The calculation of three-dimensional compressible boundary layer stability on swept wings p 818 A92-47684 The numerical simulation of compressible flow around an airfoil at high angle of attack p 818 A92-47686 A time marching method in finite volume for transonic diffuser turbulent flows p 819 A92-47690 A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial p 819 A92-47691 compressor cascades Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Calculation of hypersonic, viscous, non-equilibrium flows around reentry bodies using a coupled boundary laver/Euler method | AIAA PAPER 92-2856 | p 819 A92-47839

On the aerodynamics/dynamics of store separation from

on a ground

|SAE PAPER 912014|

[NLR-TP-89119-U]

on the prospects

[NLR-TP-90184-U]

Boundary conditions for Euler equations at internal block Computation of hypersonic flowfields in thermal and faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712 chemical nonequilibrium p 819 A92-47856 I AIAA PAPER 92-2874 I Laminar hypersonic flow over a compression using the HANA code [AD-A249284] p 820 A92-47872 I AIAA PAPER 92-28961 Enhancements to viscous-shock-layer technique p 820 A92-47873 NASA Lewis Research Center I AIAA PAPER 92-2897 I [NASA-TM-105731] Solution of the Burnett equations for hypersonic flows near the continuum limit for cascades p 821 A92-47894 [AIAA PAPER 92-2922] [NASA-CR-190480] Characteristics of the Shuttle Orbiter leeside flow during a reentry condition off-design performance of a radial flow turbine [AIAA PAPER 92-2951] p 821 A92-47915 [NASA-CR-189207] Aerothermodynamic calculations for the Space Shuttle unsteady aerodynamic analysis of airfoils using unstructured meshes IAIAA PAPER 92-29531 p 821 A92-47917 Experience with the Johnson-King turbulence model in [NASA-TM-107635] a transonic turbine cascade flow solver Hyperbolic grid generation control by panel methods [NLR-TP-91061-U] p 924 N92-29604 p 821 A92-48207 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method and orid generation [ONERA, TP NO. 1992-1] p 821 A92-48577 [NASA-CP-10092] Advanced CFD simulation and testing of compressor blading in the multistage environment AERO-REPT-8907 [AIAA PAPER 92-3040] p 822 A92-48701 Numerical computations of transonic flows through of stationary measured profile coefficients for applications cascades [AIAA PAPER 92-3041] of rotary wing aerodynamics p 822 A92-48702 [ETN-92-91491] Application of non-reflecting boundary conditions to three-dimensional Euler equation calculations for thick analysis and computational fluid dynamics strut cascades [AIAA PAPER 92-3045] [NASA-CASE-LAR-14815-1-CU] p 822 A92-48705 FNS analysis of an axisymmetric scramjet inlet [AIAA PAPER 92-3100] p 824 A92 subsonic flow in a blow down wind tunnel, and its influence p 824 A92-48742 Computational analysis of ramjet engine inlet on profile measurements [ETN-92-91492] interaction [AIAA PAPER 92-3102] p 824 A92-48744 Development and application of a zonal k-epsilon flows [AD-A248458] turbulence model for complex 3-D flowfields [AIAA PAPER 92-3176] p 903 p 903 A92-48792 COMPUTATIONAL GEOMETRY Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] COMPUTATIONAL GRIDS p 825 A92-48817 Progress towards the development of transient ram engine inlets due to shock impingement accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-2605] Future directions in computing and CFD p 904 A92-48847 [AIAA PAPER 92-3248] [AIAA PAPER 92-2734] Prediction of a high bypass ratio engine exhaust nozzle flowfield [AIAA PAPER 92-3259] p 864 A92-48855 inlet flows for the F-18 at large incidence [AIAA PAPER 92-2621] Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Fuler equations [AIAA PAPER 92-2646] A comparative study of scramjet injection strategies for high Mach numbers flows configurations IAIAA PAPER 92-32871 p 904 A92-48876 [AIAA PAPER 92-2658] A turbulence model based on RNG for quasi-three-dimensional cascade flows --- renormalization unsteady aerodynamic analysis of airfoils using group methods unstructured meshes [AIAA PAPER 92-3312] p 825 A92-48898 [AIAA PAPER 92-2694] A Navier-Stokes analysis of a controlled-diffusion compressor cascade at increasing inlet-flow angles p 825 A92-48899 analyses using PAB3D [AIAA PAPER 92-3313] Vane-blade interaction in a transonic turbine. I -[AIAA PAPER 92-2701] grid algorithm, with applications to unsteady internal (AIAA PAPER 92-3323) p 825 A92-48906 Vane-blade interaction in a transonic turbine. II - Heat [AIAA PAPER 92-2719] [AIAA PAPER 92-3324] p 904 A92-48907 applications A numerical study of two-phase flow in gas turbine [AIAA PAPER 92-2720] combustors [AIAA PAPER 92-3468] n 905 A92-49015 of ogive-cylinder at M = 3.5 and alpha = 18 deg [AIAA PAPER 92-2667] p 806 A92 Prediction of gas turbine combustor flow by a finite A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-3469] n 906 A92-49016 [AIAA PAPER 92-2693] Numerical flow simulation and analysis of a shrouded propfan rotor I AIAA PAPER 92-37731 n 826 A92-49118 multiple-element airfoils [AIAA PAPER 92-2709] A computational study of advanced exhaust system transition ducts with experimental validation [AIAA PAPER 92-3794] p 907 A92-49126 embedding techniques Viscous effects on a vortex wake in ground effect [NASA-CR-190400] p 907 N92-28361 unstructured meshes Analysis of results of an Euler-equation method applied Mesh adaptivity with the quadtree method to leading-edge vortex flow p 827 N92-28657 [NLR-TP-90368-U] Calculation of unsteady subsonic and supersonic flow Reynolds number viscous flows about oscillating wings and bodies by new panel

p 827 N92-28659

p 908 N92-28694

Turbulence modeling: Survey of activities in Belgium and

the Netherlands, and appraisal of the status and a view

p 918 A92-47051 entry vehicles An unstructured mesh generation algorithm for Explicit Navier-Stokes computation of turbomachinery three-dimensional aeronautical configurations p 918 A92-47053 p 909 N92-28879 Single block mesh generation for a fuselage plus two Applied analytical combustion/emissions research at the p 817 A92-47054 lifting surfaces Grid generation and compressible flow computations p 890 N92-29343 about a high-speed civil transport configuration Development of a multigrid transonic potential flow code p 919 A92-47055 Grid sensitivity in low Reynolds number hypersonic p 830 N92-2936 continuum flows p 817 A92-47057 A comparison of the calculated and experimental grid generation Multi-block around wing-body-engine-pylon configurations p 831 N92-29402 p 817 A92-47060 Spatial and temporal adaptive procedures for the 3-D numerical grid generation for the transonic flow analysis about multi-bodies p 817 A92-47061 p 831 N92-29445 Interactive algebraic mesh generation for twin jet transport aircraft p 817 A92-47064 Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 NASA Workshop on future directions in surface modeling Effect of the grid system on heat transfer computations p 831 N92-29625 for high speed flows p 900 A92-47071 Aeronautical Engineering Group publications, 1950 -Generation of efficient multiblock grids for Navier-Stokes omputations p 919 A92-47081 The construction, application and interpretation of computations A semi empirical method for the analytical representation three-dimensional hybrid meshes p 919 A92-47089 Orthogonal grids for multiple airfoils p 818 A92-47096 p 832 N92-29741 Numerical study of secondary separation in glancing Aerodynamic design optimization using sensitivity shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 p 910 N92-29830 Wave drag determination in the transonic full-potential Production of periodical Mach number variations in high flow code MATRICS [NLR-TP-90062-U] p 828 N92-28709 Boundary conditions for Euler equations at internal block p 833 N92-29889 faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712 Explicit Navier-Stokes computation of turbomachinery [NLR-TP-90134-U] Spatial and temporal adaptive procedures for the p 911 N92-29933 unsteady aerodynamic analysis of airfoils using unstructured meshes A geometry-integrated approach to multiblock grid [NASA-TM-107635] p 831 N92-29445 p 919 A92-47083 Hyperbolic grid generation control by panel methods [NLR-TP-91061-U] p 924 N92-29604 Numerical simulation of aerothermal loads in hypersonic COMPUTER AIDED DESIGN Two-point optimization of complete three-dimensional p 792 A92-45482 airplane configuration [AIAA PAPER 92-2618] p 844 A92-45491 p 917 A92-45489 Practical design optimization configurations using the Euler equations of wing/body Coupled numerical simulation of the external and engine [AIAA PAPER 92-2633] p 795 A92-45505 p 793 A92-45493 Transonic airfoil and wing design using Navier-Stokes Shock fitting with a finite volume approximation to the [AIAA PAPER 92-2651] p 797 A92-45518 p 796 A92-45513 Recent CFD applications on jet transport Recent CFD applications on jet transport configurations [AIAA PAPER 92-2658] p 844 A92-45519 p 844 A92-45519 Surface grid generation in a parameter space [AIAA PAPER 92-2717] p 803 A Spatial and temporal adaptive procedures for the p 803 A92-45556 A new automatic grid generation environment for CFD applications p 800 A92-45540 [AIAA PAPER 92-2720] p 803 A92-45558 Minimizing supersonic wave drag with physical constraints at design and off-design Mach numbers Commercial turbofan engine exhaust nozzle flow p 801 A92-45543 p 811 A92-46808 Numerical simulations using a dynamic solution-adaptive Grid generation and compressible flow computations about a high-speed civil transport configuration p 919 A92-47055 p 803 A92-45557 Patch-independent structured multiblock grids for CFD A new automatic grid generation environment for CFD p 919 A92-47078 computations Developing intelligent automatic test equipment p 803 A92-45558 p 922 A92-48569 Comparison of two flux splitting schemes for calculation Analytical design and demonstration of a low-cost expendable turbine engine combustor p 806 A92-45582 p 867 A92-49112 [AIAA PAPER 92-3754] Applications of ASICs to avionics p 917 A92-45589 [AGARD-AG-329] p 859 N92-28376 p 859 N92-28377 What is an ASIC? An unstructured approach to the design of Integrated Design Analysis and Optimisation of Aircraft p 807 A92-45592 Structures [AGARD-LS-186] p 851 N92-28469 Viscous high-speed flow computations by adaptive mesh p 808 A92-45839 Fundamentals of structural optimisation p 851 N92-28470 Mesh adaption for 2D transsonic Euler flows on The evaluation of simulator effectiveness for the training p 816 A92-47038 of high speed, low level, tactical flight operations p 885 N92-28539 p 816 A92-47041 Constrained spanload optimization for minimum drag of Unstructured and adaptive mesh generation for high multi-lifting-surface configurations [NLR-TP-89126-U] p 816 A92-47042 p 828 N92-28660 Anisotropic control of mesh generation based upon a Improving designer productivity --- artificial intelligence Voronoi type method p 918 A92-47043 p 854 N92-29417 INASA-TM-1039291 Grid adaptation to multiple functions for applied erodynamic analysis p 817 A92-47045 COMPUTER AIDED MANUFACTURING aerodynamic analysis Manufacturing technology methodology for propulsion Adaptive parallel meshes with complex geometry system parts p 918 A92-47050 [AIAA PAPER 92-3525] p 906 A92-49048

p 917 A92-45456

Improving designer productivity artificial intelligence	A fast three-dimensional vortex method for unsteady	AHS International Specialists' Meeting on Rotorcraft
[NASA-TM-103929] p 854 N92-29417	wake calculations	Basic Research, Georgia Institute of Technology, Atlanta,
COMPUTER AIDED TOMOGRAPHY	[AIAA PAPER 92-2624] p 794 A92-45496	Mar. 25-27, 1991, Proceedings p 846 A92-46919
Computed Tomography (CT) as a nondestructive test	Numerical study on a supersonic open cavity flow with	Numerical grid generation in computational fluid
method used for composite helicopter components	geometric modification of aft bulkhead	dynamics and related fields; Proceedings of the 3rd
[MBB-UD-0603-91-PUB] p 910 N92-29873	[AIAA PAPER 92-2627] p 794 A92-45499	International Conference, Universidad Politecnica de
COMPUTER ASSISTED INSTRUCTION	Unsteady Navier-Stokes simulations of supersonic flow	Cataluna, Barcelona, Spain, June 3-7, 1991
Design specifications for the Advanced Instructional	over a three-dimensional cavity	[ISBN 0-444-88948-5] p 918 A92-47035
Design Advisor (AIDA), volume 2	[AIAA PAPER 92-2632] p 795 A92-45504	Fiber optic and laser sensors VIII; Proceedings of the
[AD-A248202] p 923 N92-29188	Flight model for unmanned simulated helicopters	Meeting, San Jose, CA, Sept. 17-19, 1990
COMPUTER GRAPHICS	p 874 A92-46776	[SPIE-1367] p 901 A92-48026
Interactive algebraic mesh generation for twin jet	•	NAECON 91; Proceedings of the IEEE National
transport aircraft p 817 A92-47064	Hypersonic rarefied flow about a delta wing - direct	Aerospace and Electronics Conference, Dayton, OH, May
Real time presentation for RAFALE in-flight tests	simulation and comparison with experiment	20-24, 1991. Vols. 1-3
p 882 A92-47522	p 812 A92-46892	[ISBN 0-7803-0084-X] p 786 A92-48426
COMPUTER INFORMATION SECURITY	Decoupled predictions of radiative heating in air using	Turbine aircraft engine operational trending and JT8D
Systems simulation of an advanced avionics COMSEC	a particle simulation method	static component reliability study
unit p 921 A92-48485	[AIAA PAPER 92-2971] p 816 A92-46986	[DOT/FAA/CT-91/10] p 870 N92-28686
COMPUTER PROGRAMMING	New concepts for multi-block grid generation for flow	NASA Workshop on future directions in surface modeling
Development of a flight information system using the	domains around complex aerodynamic configurations	and grid generation
structured method	p 817 A92-47079	[NASA-CP-10092] p 831 N92-29625
[AD-A248207] p 859 N92-29222	Numerical experiments on unsteady shock reflection	The 1991 International Conference on Aging Aircraft and
COMPUTER PROGRAMS	processes using the thin-layer Navier-Stokes equations	Structural Airworthiness
A progress report on ASTOVL control concept studies	p 818 A92-47155	[NASA-CP-3160] p 912 N92-30106
under the VAAC programme p 871 A92-45319	Numerical simulation of chemical and thermal	CONFORMAL MAPPING
The design of a system of codes for industrial	nonequilibrium flows behind compression shocks	Multi-point inverse design of an infinite cascade of
calculations of flows around aircraft and other complex	[AIAA PAPER 92-2879] p 820 A92-47860	airfoils
aerodynamic configurations [AIAA PAPER 92-2619] p 917 A92-45492	Laminar hypersonic flow over a compression using the	[AIAA PAPER 92-2650] p 797 A92-45517
[AIAA PAPER 92-2619] p 917 A92-45492 DYNamic Turbine Engine Compressor Code	HANA code	Orthogonal grids for multiple airfoils
(DYNTECC) - Theory and capabilities	[AIAA PAPER 92-2896] p 820 A92-47872	p 818 A92-47096
[AIAA PAPER 92-3190] p 923 A92-48802	Systems simulation of an advanced avionics COMSEC	Some exact and numerical results for plane steady
Calculation of installation effects within performance	unit p 921 A92-48485	sheared flow of an incompressible inviscid fluid
computer programs p 869 N92-28465	Computational icing analysis for aircraft inlets	p 821 A92-48019
Use of a virtual cockpit for the development of a future	[AIAA PAPER 92-3178] p 836 A92-48793	CONICAL FLOW
transport aircraft p 886 N92-28547	BUWICE - An interactive icing program applied to engine	Natural flow wing
Calculation of unsteady subsonic and supersonic flow	inlets	[NASA-CASE-LAR-14281-1] p 829 N92-28729
about oscillating wings and bodies by new panel	[AIAA PAPER 92-3179] p 922 A92-48794	CONNECTORS
methods	DYNamic Turbine Engine Compressor Code	Combined load test apparatus for flat panels
(NLR-TP-89119-U) p 827 N92-28659	(DYNTECC) - Theory and capabilities	[NASA-CASE-LAR-14698-1] p 911 N92-30028
Constrained spanload optimization for minimum drag of	[AIAA PAPER 92-3190] p 923 A92-48802	CONSTRUCTION MATERIALS
multi-lifting-surface configurations	Progress towards the development of transient ram	Replacement of the NAL high pressure air storage
[NLR-TP-89126-U] p 828 N92-28660	accelerator simulation as part of the U.S. Air Force	system
A method for computing the 3-dimensional flow about	Armament Directorate Research Program	[NAL-TM-634] p 888 N92-28835
wings with leading-edge vortex separation. Part 2:	[AIAA PAPER 92-3248] p 904 A92-48847	CONTAMINANTS
Description of computer program VORSEP	Numerical simulations of the transdetonative ram	Applied analytical combustion/emissions research at the
[NLR-TR-86006-U] p 833 N92-29916	accelerator combusting flow field on a parallel computer	NASA Lewis Research Center
Experience with piloted simulation in the development	[AIAA PAPER 92-3249] p 894 A92-48848	[NASA-TM-105731] p 890 N92-29343
of helicopters	A simplified real-time engine model for developing	CONTEXT FREE LANGUAGES
[MBB-UD-0610-91-PUB] p 889 N92-30076	aeroengine control system	VHDL design and simulation for airborne graphics
Users manual for updated computer code for axial-flow	[AIAA PAPER 92-3321] p 864 A92-48904	generation requirements VLSI hardware description
compressor conceptual design	Numerical study of secondary separation in glancing	language p 902 A92-48465
[NASA-CR-189171] p 924 N92-30207	shock/turbulent boundary layer interactions	CONTINUUM FLOW
COMPUTER SYSTEMS DESIGN	[AIAA PAPER 92-3666] p 907 A92-49087	Solution of the Burnett equations for hypersonic flows
New Boeing flight test data acquisition systems	The numerical simulation of the main fuel control unit	near the continuum limit
p 920 A92-47537	of gas turbine engines [AIAA PAPER 92-3760] p 867 A92-49115	[AIAA PAPER 92-2922] p 821 A92-47894
Design considerations for a modern telemetry	Dynamic simulation of compressor and gas turbine	CONTINUUM MODELING
processing and display system p 882 A92-47584	performance p 869 N92-28463	Concept of a one-dimensional model of the dynamic
Global memory in the Pave Pace architecture	Aircraft ship operations	behavior of a gas turbine p 862 A92-47791
p 920 A92-48447	[AGARD-AR-312] p 850 N92-28468	CONTINUUMS
COMPUTER SYSTEMS PERFORMANCE	S-76B certification for vertical take-off and landing	Grid sensitivity in low Reynolds number hypersonic
A new development in embedded computer	operations from confined areas	continuum flows p 817 A92-47057
performance measurement p 921 A92-48506	[NLR-TP-90286-U] p 852 N92-28714	CONTOURS
Verification and validation of F-15 and S/MTD unique	Quaternion and Euler angles in kinematics	Adaptive parallel meshes with complex geometry
software p 921 A92-48515	[NAL-TM-636] p 909 N92-28836	p 918 A92-47050
COMPUTER SYSTEMS PROGRAMS	Modular simulation of HEI fragments and blast	CONTRAROTATING PROPELLERS
Verification and validation of F-15 and S/MTD unique	pressure	Noise of two high-speed model counter-rotation
software p 921 A92-48515	[AD-A248205] p 910 N92-29191	propellers at takeoff/approach conditions
COMPUTER TECHNIQUES	Methods for direct simulation of transition in hypersonic	p 925 A92-46799
Development of a flight information system using the	boundary layers 2 p 912 N92-30064	CONTROL CONFIGURED VEHICLES
structured method	COMPUTERS	An acrobatic airship 'Acrostat'
[AD-A248207] p 859 N92-29222	Use of a virtual cockpit for the development of a future	[SAE PAPER 911994] p 843 A92-45396
COMPUTER VISION	transport aircraft p 886 N92-28547	CONTROL EQUIPMENT
A rotorcraft flight database for validation of vision-based	CONCAVITY	Rotorcraft In-Flight Simulation Research at NASA Ames
ranging algorithms	Computations of hypersonic flows around a	Research Center: A Review of the 1980's and plans for
[NASA-TM-103906] p 841 N92-29103	three-dimensional concave/convex body [AIAA PAPER 92-2606] p 805 A92-45570	the 1990's
COMPUTERIZED SIMULATION		[NASA-TM-103873] p 853 N92-28926
Putting the control back in air traffic control - An	• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·
enhanced Universal Development Simulation System	CONFERENCES	CONTROL SIMULATION
p 916 A92-44982	CONFERENCES High Reynolds number flows using liquid and gaseous	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft
•	CONFERENCES High Reynolds number flows using liquid and gaseous helium	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783
Numerical simulation of a supersonic jet impingement	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability
Numerical simulation of a supersonic jet impingement on a ground	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London,	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem identification, solution development, and verification
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem identification, solution development, and verification
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement [AIAA PAPER 92-2605] p 792 A92-45482 Prediction of rotor unsteady airloads using vortex filament theory	High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 AIAA Applied Aerodynamics Conference, 10th, Palo	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem identification, solution development, and verification p 883 N92-28525
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement [AIAA PAPER 92-2605] p 792 A92-45482 Prediction of rotor unsteady airloads using vortex filament theory [AIAA PAPER 92-2610] p 792 A92-45484	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pts. 1 & 2	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p. 875 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p. 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p. 923 Utility of ground simulation in flight control problem identification, solution development, and verification p. 883 N92-28525 Use of high-fidelity simulation in the development of an
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement [AIAA PAPER 92-2605] p 792 A92-45482 Prediction of rotor unsteady airloads using vortex filament theory [AIAA PAPER 92-2610] p 792 A92-45484 Coupled numerical simulation of the external and engine	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers. Pts. 1 & 2 p 791 A92-45476 International Congress on Recent Developments in Airand Structure-Borne Sound and Vibration, Auburn	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem identification, solution development, and verification p 883 N92-28525 Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system
Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement [AIAA PAPER 92-2605] p 792 A92-45482 Prediction of rotor unsteady airloads using vortex filament theory [AIAA PAPER 92-2610] p 792 A92-45484	CONFERENCES High Reynolds number flows using liquid and gaseous helium [ISBN 0-387-97475-X] p 897 A92-45261 International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, Oct. 7-11, 1991, Proceedings [SAE P-246] p 783 A92-45376 AIAA Applied Aerodynamics Conference, 10th, Palo Alto, CA, June 22-24, 1992, Technical Papers, Pts. 1 & 2 p 791 A92-45476 International Congress on Recent Developments in Air-	CONTROL SIMULATION Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Utility of ground simulation in flight control problem identification, solution development, and verification p 883 N92-28525 Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530

CONTROL SURFACES	Compensating for manufacturing and life-cycle	Contingency power for a small turboshaft engine by using
Time accurate computation of unsteady transonic flows	variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139	water injection into turbine cooling air [NASA-TM-105680] p 871 N92-29661
around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567	Overview on basis and use of performance prediction	[NASA-TM-105680] p 871 N92-29661 COORDINATES
Transonic calculations for wings with deflected control	methods p 869 N92-28459	Relative energy concepts in helicopter dynamics
surfaces	Use of a research simulator for the development of new	p 846 A92-46925
AIAA PAPER 92-2617 p 805 A92-45572	concepts of flight control p 885 N92-28543	Quaternion and Euler angles in kinematics
A numerical study of control surface buzz using	Electromechanical systems with transient high power response operating from a resonant AC link	[NAL-TM-636] p 909 N92-28836
computational fluid dynamic methods	[NASA-TM-105716] p 870 N92-28985	CORE FLOW
[AIAA PAPER 92-2654] p 806 A92-45578 F-16 failure detection isolation and estimation study	Results of a flight simulator experiment to establish	A fast, uncoupled, compressible, two-dimensional,
p 876 A92-48490	handling quality guidelines for the design of future transport	unsteady boundary layer algorithm with separation for engine inlets
Robustness characteristics of fast-sampling digital PI	aircraft	[AIAA PAPER 92-3082] p 823 A92-48729
controllers for high-performance aircraft with impaired	[NLR-MP-88044-U] p 854 N92-29616 CONTROL THEORY	Interface of an uncoupled boundary layer algorithm with
control surfaces p 877 A92-48496	The method of determinant equations in the applied	an inviscid core flow algorithm for unsteady supersonic
Computation of three-dimensional effects on two	theory of optimal systems - Systems with 'rigid' constraints	engine inlets
dimensional wings	and with fixed boundary conditions p 917 A92-46629	[AIAA PAPER 92-3083]· p 823 A92-48730
[NASA-CR-190576] p 832 N92-29691 CONTROL SYSTEMS DESIGN	The propulsive-only flight control problem	CORNER FLOW Numerical and experimental investigation of rarefied
Specification of adaptive aiding systems - Information	p 876 A92-48487 Use of high-fidelity simulation in the development of an	compression corner flow
requirements for designers p 916 A92-44915	F/A-18 active ground collision avoidance system	[AIAA PAPER 92-2900] p 820 A92-47876
Integrated flight/propulsion control for supersonic	p 837 N92-28530	CORRECTION
STOVL aircraft p 872 A92-45320	Application of piloted simulation to high-angle-of-attack	Thin-airfoil correction for panel methods
Integrated flight control systems - Architectural	flight-dynamics research for fighter aircraft	p 811 A92-46811
considerations for future aircraft concepts	p 886 N92-28551 Inverse control problems: Mathematical preliminaries,	CORROSION PREVENTION Inspection of aging aircraft: A manufacturer's
p 872 A92-45322	system theoretical approaches, and their applications to	perspective p 914 N92-30117
The large scale test control systems designed and built by the Boeing Company to support the 757 and 767 major	aircraft dynamics	CORROSION RESISTANCE
fatigue tests	(LR-665) p 923 N92-28581	Anodize and prime your aluminum without environmental
[SAE PAPER 911985] p 881 A92-45388	CONTROLLABILITY	headaches p 892 A92-47340
Ducted fan VTOL for working platform	Frequency domain flight testing and analysis of an OH-58D helicopter p 847 A92-46943	Non-chromated anodize process for corrosion
[SAE PAPER 911995] p 843 A92-45397	Summary of the effects of engine throttle response on	resistance and adhesive bonding p 892 A92-47341
Avionics flight systems for the 21st century	airplane formation-flying qualities	COST ANALYSIS
[SAE PAPER 912033] p 784 A92-45421	[AIAA PAPER 92-3318] p 877 A92-48902	Life cycle costs of the C-130 electrical power system upgrade
Functional mock-up tests for flight control system of the NAL QSTOL research aircraft 'ASKA'	The use of ground based simulation for handling qualities	[AD-A246759] p 786 N92-28348
[SAE PAPER 912036] p 881 A92-45422	research: A new assessment p 885 N92-28545 Initial validation of a R/D simulator with large amplitude	COST EFFECTIVENESS
Development of the DDV actuation system on the IDF	motion p 886 N92-28546	Design and analysis of vortex generators on reengined
aircraft	Application of piloted simulation to high-angle-of-attack	Boeing 727-100QF center inlet S-duct by a reduced
[SAE PAPER 912080] p 844 A92-45455	flight-dynamics research for fighter aircraft	Navier-Stokes code [AIAA PAPER 92-2700] p 800 A92-45542
A design of strongly stabilizing controller	p 886 N92-28551	[AIAA PAPER 92-2700] p 800 A92-45542 Life cycle costs of the C-130 electrical power system
[SAE PAPER 912081] p 917 A92-45456	Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics	upgrade
A new milestone in automatic aircraft control - Fly-by-light systems transmit commands optoelectronically	[NASA-CR-4443] p 878 N92-28584	[AD-A246759] p 786 N92-28348
p 784 A92-45699	Results of a flight simulator experiment to establish	COUNTER ROTATION
Fibre optic rotary position sensors for vehicle and	handling quality guidelines for the design of future transport	Basic analysis of counter-rotating turbines
propulsion controls p 855 A92-46243	aircraft	p 862 A92-47692
Fiber optic controls for aircraft engines - Issues and	[NLR-MP-88044-U] p 854 N92-29616 CONTROLLERS	COUNTERFLOW The enhancement of mixing in high-speed heated jets
implications p 856 A92-46244 Potential for integrated optical circuits in advanced	In-flight simulation of backside operating models using	using a counterflowing nozzle
aircraft with fiber optic control and monitoring systems	direct lift controller	[AIAA PAPER 92-3262] p 825 A92-48857
p 856 A92-46246	[SAE PAPER 912069] p 872 A92-45450	COWLINGS
Integrated optic components for advanced turbine	Manual control of vehicles with time-varying dynamics ISAE PAPER 912078 0 917 A92-45454	Operating characteristics at Mach 4 of an inlet having
engine control systems p 925 A92-46248	[SAE PAPER 912078] p 917 A92-45454 A design of strongly stabilizing controller	forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743
On-line performance evaluation of multiloop digital control systems p 873 A92-46739	[SAE PAPER 912081] p 917 A92-45456	[AIAA PAPER 92-3101] p 863 A92-48743 CRACK ARREST
Approach guidance in a downburst	Comparison of three controllers applied to helicopter	Tear straps in airplane fuselage
p 873 A92-46741	vibration	[AD-A248543] p 854 N92-29511
Linear quadratic minimax controllers	[NASA-TM-102192] p 878 N92-28457 CONVECTION	CRACK CLOSURE
p 917 A92-46748	The effect of tip convection on the performance and	Contribution of individual load cycles to crack growth under aircraft spectrum loading p 891 A92-45236
X-29 H-infinity controller synthesis p 873 A92-46749	optimum dimensions of cooling fins p 902 A92-48354	CRACK GEOMETRY
Nonlinear inversion flight control for a	CONVECTIVE HEAT TRANSFER	A study on crack initiation method for durability
supermaneuverable aircraft p 873 A92-46751	Heat transfer to a cylinder submerged in a rectangular	analysis p 901 A92-47663
Integrated aeroservoelastic wing synthesis by nonlinear	cavity in supersonic flow to simulate electrical cables routed through Space Shuttle Solid Rocket Booster	CRACK INITIATION
programming/approximation concepts p 873 A92-46752	External Tank	A study on crack initiation method for durability analysis p 901 A92-47663
Two variations of certainty control	[AIAA PAPER 92-2949] p 901 A92-47913	CRACK PROPAGATION
p 918 A92-46762	Indirect measurements of convective flow by IR	Elevated temperature crack growth in aircraft engine
Study on two variable control plan for twin spool turbojet	thermography	materials p 891 A92-45234
engine p 862 A92-47697	[ONERA, TP NO. 1992-46] p 902 A92-48607	Contribution of individual load cycles to crack growth
Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783	Analytical and experimental studies of heat pipe radiation	under aircraft spectrum loading p 891 A92-45236 Reliability centered maintenance for metallic airframes
Nonlinear control design for slightly nonminimum phase	cooling of hypersonic propulsion systems [AIAA PAPER 92-3809] p 867 A92-49128	based on a stochastic crack growth approach
systems - Application to V/STOL aircraft	CONVERGENT-DIVERGENT NOZZLES	p 897 A92-45242
p 876 A92-48160	Gortler instability and supersonic quiet nozzle design	Economic life analysis for replacing components
Robust discrete controller design for an unmanned	p 813 A92-46902	p 785 A92-47670
research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495	A study on the impact of shroud geometry on ejector	Aero mechanics in the twenty-first century
feedback theory p 877 A92-48495 Optics in aircraft engines p 926 A92-48500	pumping performance	{AIAA-PAPER 92-3194} p 863 A92-48805 Tensile and interlaminar properties of GLARE (trade
Derivation of ABCD system matrices from nonlinear	[AIAA PAPER 92-3260] p 864 A92-48856	name) laminates
dynamic simulation of jet engines	Scale model test results of a multi-slotted vectoring 2DCD ejector nozzle	[AD-A250188] p 895 N92-28921
[AIAA PAPER 92-3319] p 923 A92-48903	[AIAA PAPER 92-3264] p 864 A92-48859	Generation of spectra and stress histories for fatigue
A simplified real-time engine model for developing aeroengine control system	CONVEXITY	and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180
[AIAA PAPER 92-3321] p 864 A92-48904	Computations of hypersonic flows around a	Preliminary results on the fracture analysis of multi-site
Design issues in a fiber optic sensor system architecture	three-dimensional concave/convex body	cracking of lap joints in aircraft skins
for aircraft engine control	[AIAA PAPER 92-2606] p 805 A92-45570	p 913 N92-30111
[AIAA PAPER 92-3483] p 866 A92-49023		CRACKING (FRACTURING)
	COOLING SYSTEMS The effect of tip convection on the performance and	
Intelligent Engine Control (IEC)	The effect of tip convection on the performance and optimum dimensions of cooling fins p 902 A92-48354	Investigation of the structural inhomogeneity of a
	The effect of tip convection on the performance and	
Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024	The effect of tip convection on the performance and optimum dimensions of cooling fins p 902 A92-48354	Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958

Federal Aviation Administration aging aircraft CYLINDRICAL BODIES Acquisition of an aerothermodynamic data base by Comparison of two flux splitting schemes for calculation nondestructive inspection research plan means of a winged experimental reentry vehicle |MBB/FE202/S/PUB/461| p 787 NS p 914 N92-30116 of ogive-cylinder at M = 3.5 and alpha = 18 deg p 787 N92-30232 p 806 A92-45582 Inspection of aging aircraft: manufacturer's [AIAA PAPER 92-2667] DATA COLLECTION PLATFORMS p 914 N92-30117 High-altitude lighter-than-air powered platform perspective Multiple shock-shock interference on a cylindrical p 813 A92-46899 SAE PAPER 912054 | p 844 A92-45438 leading edge A re-analysis of the causes of Boeing 727 'black hole Heat transfer to a cylinder submerged in a rectangular DATA INTEGRATION Data Link integration in commercial transport landing' crashes n 833 A92-44985 cavity in supersonic flow --- to simulate electrical cables CRASHWORTHINESS operations p 839 A92-44919 routed through Space Shuttle Solid Rocket Booster Design of helicopter composite structures crashworthiness p 848 A92-476 DATA LINKS External Tank p 848 A92-47408 I AIAA PAPER 92-29491 Mode S data link pilot-system interface - A blessing in p 901 A92-47913 Drop test: Cessna Golden Eagle 421B de skies or a beast of burden? p 839 A92-44920 CYLINDRICAL SHELLS [DOT/FAA/CT-TN91/32] p 837 N92-28900 Airborne/shipborne PSK telemetry data link Damaged stiffened shell research at NASA. Langley CREW PROCEDURES (INFLIGHT) p 839 A92-47511 p 914 N92-30115 Research Center An analysis of aircrew communication patterns and Global Positioning System telecommand link content p 839 A92-47566 D IAD-A2466181 Gulf Range Drone Control Upgrade System Mobile p 907 N92-28253 p 882 A92-47567 Control System CRITICAL VELOCITY Laser anemometer measurements and computations in Application of VME-technology on an airborne data link DAMAGE an annular cascade of high turning core turbine vanes Performance of uncoated AFRSI blankets during processor unit [NASA-TP-3252] p 830 N92-28980 multiple Space Shuttle flights INLR-MP-88040-UI p 841 N92-29615 CROSS CORRELATION INASA-TM-1038921 p 890 N92-29104 DATA PROCESSING Reduction and analysis of F-111C flight data Atmospheric turbulence spectra and correlation Generation of spectra and stress histories for fatigue [AD-A250341] functions p 853 N92-28771 and damage tolerance analysis of fuselage repairs p 915 N92-28689 [NLR-TP-89217-U] [AD-A250390] DATA PROCESSING TERMINALS p 854 N92-29180 CROSS FLOW Current DOT research on the effect of multiple site Upgrading the data processing section of the NAL Gust Wind Tunnel data processing system A calculation of penetration of the jet issuing normally p 913 N92-30112 damage on structural integrity I NAL-TM-6351 p 888 N92-28833 into a cross flow across a wall boundary layer Aging commuter aeroplanes: Fatigue evaluation and n 790 A92-45419 p 915 N92-30132 DATA RECORDING ISAE PAPER 9120291 control methods Computational study of transition front on a swept wing DAMAGE ASSESSMENT 24-bit flight test data recording format p 900 A92-47528 leading-edge model Optimal maintenance program of damage tolerance n 795 A92-45502 Double Density recording acquisition and playback structure p 785 A92-47660 p 920 A92-47534 Concepts for the stability analysis of NLF-experiments Economic life analysis for replacing components New Boeing flight test data acquisition systems p 785 A92-47670 p 920 A92-47537 I AIAA PAPER 92-27061 n 801 A92-45548 A neural network based postattack damage assessment Eigenfunction analysis of turbulent mixing phenomena DATA REDUCTION p 922 A92-48520 system Reduction and analysis of F-111C flight data [AD-A250341] p 853 N p 898 A92-45826 Generation of spectra and stress histories for fatigue Unsteady crossflow on a delta wing using particle image elocimetry p 811 A92-46804 and damage tolerance analysis of fuselage repairs
[AD-A250390] p 854 N92-29180 n 853 N92-28771 DATA SMOOTHING CRUISING FLIGHT Smooth solutions for transonic gasdynamic equations Modular simulation of HEI fragments and blast Experimental and numerical study of aerodynamic - Russian book oressure characteristics for second generation SST [ISBN 5-02-029345-8] [AD-A248205] p 809 A92-46626 p 910 N92-29191 p 844 A92-45439 [SAE PAPER 912056] Repair procedures for advanced composites for Parameter identification of linear systems based on Optimum cruise lift coefficient in initial design of let p 873 A92-46742 helicopters smoothing p 845 A92-46806 [MBB-UD-0606-91-PUB] p 787 N92-29874 DATA STRUCTURES Optimization of constant altitude-constant airspeed flight Current DOT research on the effect of multiple site Mesh adaptivity with the quadtree method p 816 A92-47041 of turboiet aircraft p 845 A92-46815 damage on structural integrity p 913 N92-30112 Analysis of the VISTA longitudinal simulation capability The construction, application and interpretation of Damage tolerance for commuter aircraft for a cruise flight condition CRYOGENIC FLUIDS p 914 N92-30114 p 876 A92-48488 three-dimensional hybrid meshes p 919 A92-47089 VHDL design and simulation for airborne graphics DAMPING Power economy in high-speed wind tunnels by choice generation requirements --- VLSI hardware description Computational aspects of helicopter trim analysis and of working fluid and temperature p 881 A92-45275 damping levels from Floquet theory p 875 A92-46933

DASSAULT AIRCRAFT p 902 A92-48465 language DATA TRANSMISSION Paint removal using cryogenic processes IAD-A2476681 p 895 N92-28912 NAECON 91; Proceedings of the IEEE National The role of simulation for the study of APIS (piloting CRYOGENIC WIND TUNNELS p 885 N92-28544 support by synthetic imagery) Aerospace and Electronics Conference, Dayton, OH, May On the measurement of subsonic flow around an 20-24, 1991. Vols. 1-3 DATA ACQUISITION appended body of revolution at cryogenic conditions in IISBN 0-7803-0084-X1 p 786 A92-48426 Double Density recording acquisition and playback p 920 A92-47534 DC GENERATORS p 880 A92-45265 Power economy in high-speed wind tunnels by choice 270-Vdc/hybrid 115 Vac electric power generating New Boeing flight test data acquisition systems p 920 A92-47537 system technology demonstrator [SAE PAPER 912051] of working fluid and temperature p 881 A92-45275 Calculation of support interferences on the aerodynamic Common airborne instrumentation system (CAIS) --p 861 A92-45435 coefficients for a wind tunnel calibration model DC 9 AIRCRAFT time-division multiplexed data acquisition system IESA-TT-1247] p 830 N92-29159 p 856 A92-47538 Maintaining the safety of an aging fleet of aircraft CUES p 837 N92-30108 Modern techniques for monitoring airborne telemetry Initial validation of a R/D simulator with large amplitude **DECISION MAKING** p 857 A92-47560 p 886 N92-28546 Airborne Data Acquisition and Relay System Specification of adaptive aiding systems - Information motion Effective cueing during approach and touchdown: requirements for designers p 839 A92-47574 p 916 A92-44915 Comparison with flight Operational noise data for OH-58D Army helicopters p 886 Getting test items to measure knowledge at the level CUMULATIVE DAMAGE p 926 N92-28292 of complexity which licensing authorities desire - Another Contribution of individual load cycles to crack growth dimension to test validity p 835 A92-45080 Status of the FAA flight loads monitoring program under aircraft spectrum loading p 891 A92-45236 p 914 N92-30113 Tasking and communication flows in the F/A-18D Sonic fatigue analysis and anti-sonic fatigue design of Acquisition of an aerothermodynamic data base by cockpit: Issues, problems, and possible solutions aircraft structure p 848 A92-47666 means of a winged experimental reentry vehicle LAD-A2459771 p 853 N92-28802 Short cracks and durability analysis of the Fokker 100 [MBB/FE202/S/PUB/461] p 787 N92-30232 DECOMMUTATORS DATA BASES wing/fuselage structure Real time presentation for RAFALE in-flight tests The development of an intelligent human factors data [NLR-TP-90336-U] p 910 N92-29603 p 882 A92-47522 CURVED BEAMS base as an aid for the investigation of aircraft accidents p 928 A92-44994 Linear analysis of naturally curved and twisted Thermal QNDE detection of airframe disbonds Establishing a database for flight in the wakes of anisotropic beam p 899 A92-46936 p 914 N92-30118 p 810 A92-46782 structures CURVES **DEFENSE PROGRAM** An explanation-based-learning approach to knowledge Surface grid generation in a parameter space An overview of US Navy and Marine Corps V/STOL [AIAA PAPER 92-2717] compilation - A Pilot's Associate application p 803 A92-45556 p 783 A92-45303 p 920 A92-48220 CYCLIC LOADS Experimental aerodynamic facilities of the Aerodynamics Binary optical filters for scale invariant pattern Elevated temperature crack growth in aircraft engine Research and Concepts Assistance Branch recognition materials p 891 A92-45234 [AD-A247489] p 883 N92-28248 [NASA-TM-103902] p 853 N92-28910 Contribution of individual load cycles to crack growth DEGRADATION A rotorcraft flight database for validation of vision-based under aircraft spectrum loading p 891 A92-45236 Assessment of valve actuator motor rotor degradation ranging algorithms Numerical analysis of an engine turbine disk loaded with by Fourier Analysis of current waveform p 841 N92-29103 [DE92-013233] p 909 N92-28814 large number of thermomechanical cycles Development of a flight information system using the p 902 A92-48592 IONERA, TP NO. 1992-311 DEGREES OF FREEDOM structured method Engine fan blade low cycle fatigue testing Use of simulation in the USAF Test Pilot School p 859 N92-29222 [AIAA PAPER 92-3478] Status of the FAA flight loads monitoring program p 914 N92-30113 p 866 A92-49021 curriculum p 884 N92-28535 Short cracks and durability analysis of the Fokker 100 DEICERS ving/fuselage structure Communication: An important element of maintenance Advanced pneumatic impulse ice protection system INLR-TP-90336-U1 p 838 N92-30124 p 910 N92-29603 (PIIP) for aircraft and repair p 845 A92-46807

DIRECTIONAL SOLIDIFICATION (CRYSTALS) Results of a low power ice protection system test and Aerodynamic design optimization using sensitivity a new method of imaging data analysis analysis and computational fluid dynamics Axial alignment of short-fiber titanium aluminide p 828 N92-28696 p 910 N92-29830 NASA-CASE-LAR-14815-1-CU composites by directional solidification p 892 A92-46838 Experience with piloted simulation in the development of helicopters Results of a low power ice protection system test and DIRECTIONAL STABILITY [MBB-UD-0610-91-PUB] p 889 N92-30076 Estimation of spaceplane lateral-directional stability and a new method of imaging data analysis p 828 N92-28696 [NASA-TM-105745] Users manual for updated computer code for axial-flow control derivatives from dynamic wind tunnel test compressor conceptual design p 872 A92-45384 |SAE PAPER 911979| DELTA WINGS p 924 N92-30207 INASA-CR-1891711 Flow field around thick delta wing with rounded leading An experimental investigation of the effect of **DESTRUCTIVE TESTS** leading-edge extensions on directional stability and the Design of helicopter composite structures for p 789 A92-45409 [SAE PAPER 912009] effectiveness of forebody nose strakes crashworthiness p 848 A92-47408 p 802 A92-45554 Numerical investigation into high-angle-of-attack | AIAA PAPER 92-2715 | DETECTION leading-edge vortex flow DIRICHLET PROBLEM On the optimization of windshear warning and guidance [AIAA PAPER 92-2600] p 791 A92-45477 Two-point optimization of complete three-dimensional systems Vortex trapping on a 60 degree delta wing INLR-TP-90196-U airplane configuration p 837 N92-29703 [AIAA PAPER 92-2639] p 796 A92-45508 IAIAA PAPER 92-26181 p 844 A92-45491 DETERIORATION DISCRIMINANT ANALYSIS (STATISTICS) Forebody vortex control for suppressing wing rock on Replacement of the NAL high pressure air storage Binary optical filters for scale invariant pattern a highly-swept wing configuration system recognition I AIAA PAPER 92-27161 p 803 A92-45555 p 888 N92-28835 INASA-TM-1039021 p 853 N92-28910 Experimental investigation of vortex dynamics on delta Aging commuter aeroplanes: Fatigue evaluation and DISPLACEMENT p 915 N92-30132 wings control methods p 804 A92-45565 [AIÃA PAPER 92-2731] Periodic trim solutions with hp-version finite elements **DETERMINANTS** p 874 A92-46931 Prediction of leading-edge vortex breakdown on a delta The method of determinant equations in the applied Wavelength encoded fiber optic angular displacement theory of optimal systems - Systems with 'rigid' constraints wing oscillating in roll p 857 A92-48046 and with fixed boundary conditions p 917 A92-46629 sensor [AIAA PAPER 92-2677] p 807 A92-45585 DETONABLE GAS MIXTURES DISPLAY DEVICES Nonuniform motion of leading-edge vortex breakdown p 808 A92-45828 Mixing and combustion effects in a sliding-wedge ram Mode S data link pilot-system interface - A blessing in on ramp pitching delta wings accelerator with hydrogen injection de skies or a beast of burden? p 839 A92-44920 Experimental study of vortex flows over delta wings in p 890 A92-48849 [AIAA PAPER 92-3251] Electronic presentation of instrument approach p 810 A92-46787 wing-rock motion DETONATION p 855 A92-44923 information Unsteady crossflow on a delta wing using particle image High spatial resolution measurements of ram accelerator p 811 A92-46804 Perspective versus plan view air traffic control (ATC) velocimetry gas dynamic phenomena [AIAA PAPER 92-3244] displays - Survey and empirical results Hypersonic rarefied flow about a delta wing - direct p 903 A92-48844 p 896 A92-44967 simulation and comparison with experiment Numerical simulations of the transdetonative ram Real targets, unreal displays - The inadvertent p 812 A92-46892 accelerator combusting flow field on a parallel computer suppression of critical radar data p 839 A92-44969 Analysis of results of an Euler-equation method applied [AIAA PAPER 92-3249] p 894 A92-48848 Toward an integrated multimodal approach to flight to leading-edge vortex flow **DETONATION WAVES** [NLR-TP-90368-U] p 827 N92-28657 simulation p 880 A92-45026 Laser-initiated conical detonation wave for supersonic Centre for Flight Simulation Berlin Airbus 340 simulator Identification of aerodynamic models for maneuvering combustion. III for research and training p 880 A92-45028 aircraft [AIAA PAPER 92-3247] p 893 A92-48846 [NASA-CR-190444] A simulator study of a flight reference display for p 852 N92-28720 DIESEL ENGINES Natural flow wing A preliminary design and analysis of an advanced powered-lift STOL aircraft p 829 N92-28729 [NASA-CASE-LAR-14281-1] heat-rejection system for an extreme altitude advanced ISAE PAPER 9120671 p 855 A92-45449 A method for computing the 3-dimensional flow about variable cycle diesel engine installed in a high-altitude Real time presentation for RAFALE in-flight tests advanced research platform p 882 A92-47522 wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP NASA-CR-186021 p 871 N92-29427 Design considerations for a modern telemetry p 833 N92-29916 DIFFUSERS | NLR-TR-86006-U | processing and display system p 882 A92-47584 Numerical simulation of a confined transonic normal DEPOSITION Initial validation of a R/D simulator with large amplitude shock wave/turbulent boundary layer interaction Report on the workshop on Ion Implantation and Ion p 886 N92-28546 motion Beam Assisted Deposition LAIAA PAPER 92-36681 p 826 A92-49088 Tasking and communication flows in the F/A-18D Diffuser casing upgrade for an advanced turbofan [AD-A250561] n 927 N92-28923 cockpit: Issues, problems, and possible solutions INLR-TP-90097-U1 p 870 N92-28711 DESCENT [AD-A245977] p 853 N92-28802 DIGITAL SIMULATION unified procedure for solving rotor flowfield, DISTURBANCES Numerical simulations of separated flows around performance and interference p 814 A92-46950 Discrete modes and continuous spectra in supersonic oscillating airfoil for dynamic stall phenomena **DESIGN ANALYSIS** boundary layers p 809 A92-46264 p 788 A92-45393 The role of nonmetallic fasteners in aircraft wings and ISAE PAPER 9119911 DIVERTERS Numerical simulations of hypersonic real-gas flows over other composite structures p 784 A92-47413 Air ejector experiments using the two-dimensional Analysis of a hydrocarbon scramjet with augmented space vehicles supersonic cascade tunnel: Zero secondary flow ISAE PAPER 9120451 preburning [AIAA PAPER 92-3425] p 791 A92-45429 Compressible Navier-Stokes solutions for a suction p 865 A92-48984 [NAL-TM-632] p 887 N92-28829 boundary control airfoil Design criteria and analysis of the dynamic behavior DOCUMENTS of high speed, heavily loaded and precision epicyclic gears LAIAA PAPER 92-27101 p 802 A92-45551 Aeronautical Engineering Group publications, 1950 -Numerical simulations using a dynamic solution-adaptive for aircraft use present [AIAA PAPER 92-3491] p 906 A92-49028 grid algorithm, with applications to unsteady internal I AERO-REPT-8907 I p 910 N92-29683 Engine aircraft systems integration course DOMES (STRUCTURAL FORMS) [AIAA PAPER 92-2719] p 928 A92-49117 [AIAA PAPER 92-3762] Mixing in the dome region of a staged gas turbine Integrated Design Analysis and Optimisation of Aircraft Numerical simulation of multizone two-dimensional combustor transonic flows using the full Navier-Stokes equations [AIAA PAPER 92-3089] p 903 A92-48734 p 815 A92-46955 [AGARD-LS-186] p 851 N92-28469 DOPPLER EFFECT The numerical simulation of compressible flow around Fundamentals of structural optimisation Passive acoustic range estimation of helicopters p 851 N92-28470 an airfoil at high angle of attack p 818 A92-47686 LAD-A2480331 p 926 N92-28302 Applying advanced digital simulation techniques in DOPPLER RADAR Practical architecture of design optimisation software for p 921 A92-48489 designing fault tolerant systems aircraft structures taking the MBB-Lagrange code as an IsoDoppler and mocomp corrections improve MTI p 851 N92-28471 Numerical simulation of turbine 'hot spot' alleviation p 898 A92-45774 Structural optimization of aircraft p 851 N92-28471 using film cooling DOWNBURSTS p 904 A92-48896 LAIAA PAPER 92-33091 Multidisciplinary design and optimization Approach guidance in a downburst p 851 N92-28473 Numerical simulation of a confined transpolic normal p 873 A92-46741 (AGARD-PAPER-2) shock wave/turbulent boundary layer interaction DRAG COEFFICIENTS Mathematical optimization: A powerful tool for aircraft 1 AIAA PAPER 92-3668 | p 826 A92-49088 p 851 N92-28474 Vortex trapping on a 60 degree delta wing Numerical flow simulation and analysis of a shrouded [AIAA PAPER 92-2639] p 796 A92-45508 Dynamics of a split torque helicopter transmission p 910 N92-29136 propfan rotor INASA-TM-1056811 Aircraft spoiler effects under wind shear AIAA PAPER 92-3773 | Design specifications for the Advanced Instructional p 826 A92-49118 [AIAA PAPER 92-2642] p 796 A92-45509 Design Advisor (AIDA), volume 2 DIGITAL SYSTEMS DRAG REDUCTION Common airborne instrumentation system (CAIS) ---IAD-A2482021 p 923 N92-29188 Experimental and numerical study of aerodynamic time-division multiplexed data acquisition system A preliminary design and analysis of an advanced characteristics for second generation SST |SAE PAPER 912056| p 844 A92-45439 | Aerodynamic shape optimization of hypersonic heat-rejection system for an extreme altitude advanced p 856 A92-47538 Robustness characteristics of fast-sampling digital PI variable cycle diesel engine installed in a high-altitude configurations including viscous effects controllers for high-performance aircraft with impaired advanced research platform p 871 N92-29427 |NASA-CR-186021| control surfaces p 877 A92-48496 p 877 A92-48499 | AIAA PAPER 92-2635 | p 795 A92-45506 Making fly-by-light a reality Technology programme: Aerothermodynamics and Turbulent drag reduction by laminar sublayer Flight simulation and digital flight controls propulsion integration. Numerical and experimental thickening aerothermodynamics p 884 N92-28526 | AIAA PAPER 92-2707 | p 801 A92-45549 LMBB-FF-202-S-PUB-0464-A1 p 831 N92-29648 DIRECTIONAL CONTROL Minimizing supersonic wave drag with physical constraints at design and off-design Mach numbers Concurrent engineering in design of aircraft structures Numerical analysis of RCS jet in hypersonic flights

p 854 N92-29650

|SAE PAPER 912063|

|MBB-FE-2-S-PUB-472|

p 811 A92-46808

DROOPED AIRFOILS		SUBJECT INDEX
The design and testing of an airfoil with hybrid laminar	DYNAMIC PRESSURE	Electric actuation system duty cycles in
flow control	Improved method for estimation of the maximum	fly-by-wire/power-by-wire control p 877 A92-48494
[ONERA, TP NO. 1992-22] p 822 A92-48585	instantaneous distortion values	ELECTRIC CURRENT
The A320 laminar fin programme [ONERA, TP NO. 1992-23] p 849 A92-48586	AIAA PAPER 92-3623 p 826 A92-49076 DYNAMIC PROGRAMMING	Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform
Constrained spanload optimization for minimum drag of	Optimal maintenance program of damage tolerance	[DE92-013233] p 909 N92-28814
multi-lifting-surface configurations	structure p 785 A92-47660	ELECTRIC EQUIPMENT
[NLR-TP-89126-U] p 828 N92-28660	DYNAMIC RESPONSE	Life cycle costs of the C-130 electrical power system
DROOPED AIRFOILS Studies in general aviation aerodynamics	Hang-glider response to atmospheric inputs	upgrade [AD-A246759] p 786 N92-28348
[NASA-CR-190431] p 827 N92-28511	p 874 A92-46765 Analysis of the VISTA longitudinal simulation capability	ELECTRIC GENERATORS
DROP SIZE	for a cruise flight condition p 876 A92-48488	Electric power generating system for the Boeing 777
Assessment of one-dimensional icing forecast model	Response of helicopters to gusts	airplane
applied to stratiform clouds p 915 A92-46803 The influence of spray angle on the continuous- and	[NLR-TP-90159-U] p 879 N92-28653	[SAE PAPER 912050] p 861 A92-45434 Generators inside small engines
discrete-phase flowfield downstream of an engine	Buffet test in the National Transonic Facility	[AIAA PAPER 92-3755] p 867 A92-49113
combustor swirt cup	[NASA-CR-189595] p 888 N92-29352	ELECTRIC MOTOR VEHICLES
[AIAA PAPER 92-3231] p 863 A92-48832	DYNAMIC STRUCTURAL ANALYSIS Dynamic analysis of rotor flex-structure based on	Electromechanical systems with transient high power response operating from a resonant AC link
DROP TESTS Drop test: Cessna Golden Eagle 421B	nonlinear anisotropic shell models p 899 A92-46946	[NASA-TM-105716] p 870 N92-28985
[DOT/FAA/CT-TN91/32] p 837 N92-28900	Free vibration analysis of branched blades by the	ELECTRIC MOTORS
DUCT GEOMETRY	integrating matrix method p 847 A92-47122	Assessment of valve actuator motor rotor degradation
New method of swirt control in a diffusing S-duct p 809 A92-45859	Failure model development for an integrally bladed turbine wheel	by Fourier Analysis of current waveform [DE92-013233] p 909 N92-28814
A computational study of advanced exhaust system	[AIAA PAPER 92-3420] p 865 A92-48979	ELECTRIC POWER SUPPLIES
transition ducts with experimental validation	Buffet test in the National Transonic Facility	270-Vdc/hybrid 115 Vac electric power generating
[AIAA PAPER 92-3794] p 907 A92-49126	[NASA-CR-189595] p 888 N92-29352	system technology demonstrator
Inlet distortion effects in aircraft propulsion system integration p 869 N92-28464	DYNAMIC TESTS	[SAE PAPER 912051] p 861 A92-45435 An artificial intelligence approach for the verification of
integration p 869 N92-28464 DUCTED BODIES	Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test	requirements for aircraft electrical power systems
Waves and thermodynamics in high Mach number	[SAE PAPER 911979] p 872 A92-45384	p 863 A92-48481
propulsive ducts p 809 A92-46431	Spaceplane longitudinal aerodynamic parameter	ELECTRICAL IMPEDANCE 270-Vdc/hybrid 115 Vac electric power generating
DUCTED FAN ENGINES	estimation by cable-mount dynamic wind-tunnel test	270-Vdc/hybrid 115 Vac electric power generating system technology demonstrator
Ducted fan VTOL for working platform [SAE PAPER 911995] p 843 A92-45397	[SAE PAPER 911980] p 788 A92-45385	[SAE PAPER 912051] p 861 A92-45435
DUCTED FLOW	E	ELECTROMAGNETIC INTERFERENCE
Navier-Stokes analysis and experimental data	E	270-Vdc/hybrid 115 Vac electric power generating system technology demonstrator
comparison of compressible flow in a diffusing S-duct	EARTH ATMOSPHERE	[SAE PAPER 912051] p 861 A92-45435
[AIAA PAPER 92-2699] p 800 A92-45541	Stability and inherent precision of two methods for	ELECTROMAGNETIC NOISE
Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced	solving motion and ablation equations for fireball-forming	Jet aircraft noise at high subsonic flight Mach
Navier-Stokes code	bodies in the earth atmosphere p 929 A92-46595 ECONOMIC ANALYSIS	numbers (DLR-FB-91-28) p 928 N92-29997
[AIAA PAPER 92-2700] p 800 A92-45542	Economic life analysis for replacing components	ELECTROMECHANICAL DEVICES
Laser velocimetry measurements in an MHD	p 785 A92-47670	Electromechanical systems with transient high power
aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996	FAA aviation forecasts	response operating from a resonant AC link [NASA-TM-105716] p 870 N92-28985
Experimental validation of a line-duct acoustics model	[AD-A250412] p 837 N92-29182 ECONOMIC FACTORS	ELECTRONIC AIRCRAFT
including flow	Safety vs. economy, system-theoretic approach to the	Making fly-by-light a reality p 877 A92-48499
[NLR-TP-90223-U] p 927 N92-28695	problem analysis p 916 A92-45002	ELECTRONIC CONTROL
Explicit Navier-Stokes computation of turbomachinery	EDUCATION Applied Computational Accodungmics - Cosp studies	Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024
flows [AD-A249284] p 909 N92-28879	Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580	ELECTRONIC MODULES
DUCTS	Applied aerodynamics education - Design and science	A high performance general purpose processing element
Experimental and analytical study of close-coupled	[AIAA PAPER 92-2662] p 928 A92-45581	for avionic applications p 920 A92-48440 Applications of silicon hybrid multi-chip modules to
ventral nozztes for ASTOVL aircraft p 861 A92-45325	EFFECTIVENESS Piloted Simulation Effectiveness	avionics p 859 N92-28379
DUMP COMBUSTORS Swirl number effects on confined flows in a model of	[AGARD-CP-513] p 786 N92-28522	ELECTRONIC WARFARE
a dump combustor p 896 A92-45202	Opportunities for flight simulation to improve operational	The application of multimedia expert systems to the
A new vane swirler as applied to dual-inlet side-dump	effectiveness p 883 N92-28523 Piloted simulation effectiveness development	depot level maintenance environment p 922 A92-48557
combustor	Piloted simulation effectiveness development applications and limitations p 883 N92-28524	EMBEDDED COMPUTER SYSTEMS
[AIAA PAPER 92-3654] p 906 A92-49085	Utility of ground simulation in flight control problem	Viscous high-speed flow computations by adaptive mesh
DYNAMIC CHARACTERISTICS Inverse control problems: Mathematical preliminaries,	identification, solution development, and verification	embedding techniques p 808 A92-45839
system theoretical approaches, and their applications to	p 883 N92-28525 Experience with piloted simulation in the development	A new development in embedded computer performance measurement p 921 A92-48506
aircraft dynamics	of helicopters p 884 N92-28528	Partitioned software support concept for modular
[LR-665] p 923 N92-28581	EFFECTS	embedded computer software p 922 A92-48518
DYNAMIC CONTROL Dynamic control of aerodynamic instabilities in gas	Effects of bleed air extraction on thrust levels on the	END PLATES Establishing two-dimensional flow in a large-scale planar
turbine engines p 870 N92-28466	F404-GE-400 turbofan engine [NASA-TM-104247] p 871 N92-29425	turbine cascade
Inverse control problems: Mathematical preliminaries,	EIGENVECTORS	[AIAA PAPER 92-3066] p 823 A92-48720
system theoretical approaches, and their applications to	Eigenfunction analysis of turbulent mixing phenomena	ENERGY SPECTRA
aircraft dynamics [LR-665] p 923 N92-28581	p 898 A92-45826	Atmospheric turbulence spectra and correlation functions
[LR-665] p 923 N92-28581 DYNAMIC LOADS	EJECTION INJURIES Scenario analysis of thigh gap related ejection injuries	[NLR-TP-89217-U] p 915 N92-28689
Prediction of dynamic hub load of a rotor executing	p 834 A92-44995	ENERGY TRANSFER
multiple sinusoidal blade pitch variations	EJECTION SEATS	The relationship between mode localization and energy
p 846 A92-46921	Scenario analysis of thigh gap related ejection injuries	transmission parameters in the vibration of coupled structures p 925 A92-45921
DYNAMIC MODELS System for generating sequences of phased gust or taxi	p 834 A92-44995 EJECTORS	Non-linear interactions in homogeneous turbulence with
loadings p 845 A92-46800	Aerodynamic performance of a full-scale lifting ejector	and without background rotation p 912 N92-30044
Relative energy concepts in helicopter dynamics	system in a STOVL fighter aircraft	ENGINE AIRFRAME INTEGRATION
	[AIAA PAPER 92-3094] p 824 A92-48738	Evolution of ASTOVL aircraft design p 842 A92-45311
p 846 A92-46925		p 0-2 /132-43311
Chaotic dynamic behavior in a simplified rotor blade lag	Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow	ASTOVL engine control p 860 A92-45321
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926	supersonic cascade tunnel: Zero secondary flow performance	Investigations of propulsion integration interference
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926 Bilinear formulation applied to the stability and response	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829	Investigations of propulsion integration interference effects on a transport aircraft configuration
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-532] p 887 N92-28829 ELASTIC PROPERTIES	Investigations of propulsion integration interference effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 A92-48739
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926 Bilinear formulation applied to the stability and response of helicopter rotor blade p 847 A92-46930	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829	Investigations of propulsion integration interference effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 A92-48739 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926 Bilinear formulation applied to the stability and response of helicopter rotor blade p 847 A92-46930 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Dynamic simulation of compressor and gas turbine	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 ELASTIC PROPERTIES The relationship between tensile and flexural strength of unidirectional composites p 891 A92-45629 ELECTRIC CONTROL	Investigations of propulsion integration interference effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 A92-48739 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression scramjet inlets
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926 Bilinear formulation applied to the stability and response of helicopter rotor blade p 847 A92-46930 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Dynamic simulation of compressor and gas turbine performance p 869 N92-28463	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-532] p 887 N92-28829 ELASTIC PROPERTIES The relationship between tensile and flexural strength of unidirectional composites p 891 A92-45629 ELECTRIC CONTROL Variable displacement electro-hydrostatic actuator for	Investigations of propulsion integration interference effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 A92-48739 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression scramjet inlets [AIAA PAPER 92-3099] p 824 A92-48741
Chaotic dynamic behavior in a simplified rotor blade lag model p 846 A92-46926 Bilinear formulation applied to the stability and response of helicopter rotor blade p 847 A92-46930 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Dynamic simulation of compressor and gas turbine	supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 ELASTIC PROPERTIES The relationship between tensile and flexural strength of unidirectional composites p 891 A92-45629 ELECTRIC CONTROL	Investigations of propulsion integration interference effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 A92-48739 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression scramjet inlets

Fight and the section of the section A. Conoral	Applytical design and demonstration of a law cost	Aging aircraft NDI Development and Demonstration
Fighter airframe/propulsion integration - A General	Analytical design and demonstration of a low-cost expendable turbine engine combustor	Center (AANC): An overview nondestructive
Dynamics perspective IAIAA PAPER 92-33321 p 850 A92-48915	[AIAA PAPER 92-3754] p 867 A92-49112	inspection p 915 N92-30120
• • •	Generators inside small engines	
Fighter airframe/propulsion integration - A McDonnell	[AIAA PAPER 92-3755] p 867 A92-49113	ENGINE TESTS
Aircraft perspective	Emerging technologies for gas turbine engines - U.A.V.	An experimental investigation of high-aspect-ratio
[AIAA PAPER 92-3333] p 850 A92-48916	synergies	cooling passages
Emerging airframe/propulsion integration technologies	[AIAA PAPER 92-3757] p 867 A92-49114	[AIAA PAPER 92-3154] p 890 A92-48780
at General Electric	Conceptual study of separated core ultra high bypass	Engine fan blade low cycle fatigue testing
[AIAA PAPER 92-3335] p 850 A92-48917	engine	[AIAA PAPER 92-3478] p 866 A92-49021
The application of flight simulation models in support	[AIAA PAPER 92-3775] p 867 A92-49119	A comparison of the calculated and experimental
of rotorcraft design and development	Design and off-design point characteristics of Separated	off-design performance of a radial flow turbine
p 884 N92-28527		[NASA-CR-189207] p 831 N92-29402
ENGINE CONTROL	Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120	Effects of bleed air extraction on thrust levels on the
Integrated flight/propulsion control for supersonic	[AIAA PAPER 92-3776] p 867 A92-49120 Steady and Transient Performance Prediction of Gas	F404-GE-400 turbofan engine
STOVL aircraft p 872 A92-45320	Turbine Engines	[NASA-TM-104247] p 871 N92-29425
ASTOVL engine control p 860 A92-45321		ENGINEERING MANAGEMENT
Space Shuttle Orbiter auxiliary power unit status		NASA engineers and the age of Apollo
[SAE PAPER 912060] p 889 A92-45442	Overview on basis and use of performance prediction	[NASA-SP-4104] p 929 N92-28344
· · · · · · · · · · · · · · · · · · ·	methods p 869 N92-28459	ENTHALPY
Fiber optic controls for aircraft engines - Issues and	Practical considerations in designing the engine cycle	Separated high enthalpy dissociated laminar hypersonic
implications p 856 A92-46244	p 869 N92-28460	flow behind a step - Pressure measurements
Integrated optic components for advanced turbine	Component performance requirements p 869 N92-28462	p 809 A92-45858
engine control systems p 925 A92-46248	Dynamic simulation of compressor and gas turbine	Measurement of shock-wave/boundary-layer interaction
Fiber optic speed sensor for advanced gas turbine	performance p 869 N92-28463	in a free-piston shock tunnel p 813 A92-46903
engine control p 857 A92-48044		ENTROPY
Fiber-optic pressure sensor system for gas turbine	Contingency power for a small turboshaft engine by using water injection into turbine cooling air	Laser-initiated conical detonation wave for supersonic
engine control p 857 A92-48047	[NASA-TM-105680] p 871 N92-29661	combustion. III
Optics in aircraft engines p 926 A92-48500	Users manual for updated computer code for axial-flow	[AIAA PAPER 92-3247] p 893 A92-48846
Summary of the effects of engine throttle response on	compressor conceptual design	ENVIRONMENT EFFECTS
airplane formation-flying qualities	[NASA-CR-189171] p 924 N92-30207	Paint removal using cryogenic processes [AD-A247668] p 895 N92-28912
[AIAA PAPER 92-3318] p 877 A92-48902	ENGINE FAILURE	
Derivation of ABCD system matrices from nonlinear	Mathematical modeling of the flight of passenger aircraft	ENVIRONMENTAL CONTROL
dynamic simulation of jet engines	in the case of engine failure p 875 A92-47777	Demonstration of gas liquid separation under the
[AIAA PAPER 92-3319] p 923 A92-48903	ENGINE INLETS	microgravity by aircraft KC-135
A simplified real-time engine model for developing	Numerical simulation of aerothermal loads in hypersonic	[SAE PAPER 912024] p 897 A92-45416
aeroengine control system	engine inlets due to shock impingement	High-altitude lighter-than-air powered platform
	[AIAA PAPER 92-2605] p 792 A92-45482	[SAE PAPER 912054] p 844 A92-45438
·	Coupled numerical simulation of the external and engine	Anodize and prime your aluminum without environmental
Design issues in a fiber optic sensor system architecture	inlet flows for the F-18 at large incidence	headaches p 892 A92-47340
for aircraft engine control	[AIAA PAPER 92-2621] p 793 A92-45493	ENVIRONMENTAL TESTS
[AIAA PAPER 92-3483] p 866 A92-49023	Design and analysis of vortex generators on reengined	Research of environmental spectrum for aircraft
Intelligent Engine Control (IEC)	Boeing 727-100QF center inlet S-duct by a reduced	structure p 785 A92-47655
[AIAA PAPER 92-3484] p 866 A92-49024	Navier-Stokes code	EQUATIONS OF MOTION
Subsonic flight test evaluation of a performance seeking	[AIAA PAPER 92-2700] p 800 A92-45542	Stability and inherent precision of two methods for
control algorithm on an F-15 airplane	Interface of an uncoupled boundary layer algorithm with	solving motion and ablation equations for fireball-forming
[AIAA PAPER 92-3743] p 878 A92-49109	an inviscid core flow algorithm for unsteady supersonic	bodies in the earth atmosphere p 929 A92-46595
Thrust stand evaluation of engine performance	engine inlets	Aircraft stabilization at large angles of attack
improvement algorithms in an F-15 airplane	[AIAA PAPER 92-3083] p 823 A92-48730	p 875 A92-47785 EQUILIBRIUM FLOW
[AIAA PAPER 92-3747] p 866 A92-49111 Compensating for manufacturing and life-cycle	Internal shock interactions in propulsion/airframe	Multidimensional Euler/Navier-Stokes analysis for
variations in aircraft engine control systems	integrated three-dimensional sidewall compression	hypersonic equilibrium gas
[AIAA PAPER 92-3869] p 868 A92-49139	scramjet inlets	[SAE PAPER 912026] p 790 A92-45418
ENGINE COOLANTS	[AIAA PAPER 92-3099] p 824 A92-48741	EQUIPMENT SPECIFICATIONS
An experimental investigation of high-aspect-ratio	FNS analysis of an axisymmetric scramjet inlet	Integrated wiring system
cooling passages	[AIAA PAPER 92-3100] p 824 A92-48742	[SAE PAPER 912058] p 897 A92-45440
[AIAA PAPER 92-3154] p 890 A92-48780	Operating characteristics at Mach 4 of an inlet having	EQUIVALENCE
ENGINE DESIGN	forward-swept, sidewall-compression surfaces	A method of failure analysis of complicated structures
VSTOL engine design evolution - Growth of the Pegasus	[AIAA PAPER 92-3101] p 863 A92-48743	p 901 A92-47656
engine for Harrier p 860 A92-45306	Computational analysis of ramjet engine inlet	Calculation methods on equivalence ratio of
Current technology propulsion systems meet the STOVL	interaction	multi-propellant for propulsion system
window of opportunity p 860 A92-45307	[AIAA PAPER 92-3102] p 824 A92-48744	p 893 A92-48269
A USAF assessment of STOVL fighter options	Computational icing analysis for aircraft inlets	EROSION
p 842 A92-45310	[AIAA PAPER 92-3178] p 836 A92-48793	Ground surface erosion - British Aerospace test facility
Hot-gas reingestion - Engine response considerations		and experimental studies p 881 A92-45323
p 860 A92-45317	BUWICE - An interactive icing program applied to engine inlets	ERROR ANALYSIS
Suppression of fatigue-inducing cavity acoustic modes	[AIAA PAPER 92-3179] p 922 A92-48794	Sensor fault detection on board an aircraft with observer
in turbofan engines p 925 A92-46809		and polynomial classifier
CIS engines. I - The range revealed	A new vane swirler as applied to dual-inlet side-dump	(DLR-FB-91-34) p 859 N92-29870
p 786 A92-47821	combustor	ERRORS
The impact of advanced materials on small turbine	[AIAA PAPER 92-3654] p 906 A92-49085	Periodic trim solutions with hp-version finite elements
engines	ENGINE MONITORING INSTRUMENTS	in time p 874 A92-46931
[SAE PAPER 911207] p 862 A92-48021	The use of optical sensors and signal processing gas	Turbine aircraft engine operational trending and JT8D
Design and test of an Active Tip Clearance System for	turbine engines p 856 A92-46247	static component reliability study
centrifugal compressors	Wind-tunnel compressor stall monitoring using neural	[DOT/FAA/CT-91/10] p 870 N92-28686
[AIAA PAPER 92-3189] p 863 A92-48801	networks p 918 A92-46817	ESCAPE CAPSULES
Aero mechanics in the twenty-first century	Fiber optic speed sensor for advanced gas turbine	US Navy revisits escape modules p 849 A92-47975
[AIAA PAPER 92-3194] p 863 A92-48805	engine control p 857 A92-48044	EULER EQUATIONS OF MOTION
A comparative study of scramjet injection strategies for	Engine performance and health monitoring models using	Computational aerodynamics in aircraft design -
high Mach numbers flows	steady state and transient prediction methods	Challenges and opportunities for Euler/Navier-Stokes
[AIAA PAPER 92-3287] p 904 A92-48876	p 870 N92-28467	methods
Investigation of three-dimensional flow field in a turbine	ENGINE PARTS	[SAE PAPER 911990] p 788 A92-45392
including rotor/stator interaction. I - Design development	Study of grinding process and strength for ceramic heat	Multidimensional Euler/Navier-Stokes analysis for
and performance of the research facility		hypersonic equilibrium gas
LALA BARER OF COST	insulated engine	LOAD DADED MARCON
[AIAA PAPER 92-3325] p 883 A92-48908	insulated engine [SME PAPER MR91-177] p 897 A92-45260	SAE PAPER 912026 p 790 A92-45418
Advanced Rotorcraft Transmission program summary	[SME PAPER MR91-177] p 897 A92-45260	Practical design optimization of wing/body
Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936		Practical design optimization of wing/body configurations using the Euler equations
Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission	[SME PAPER MR91-177] p 897 A92-45260 Advanced superalloys for turbine blade and vane	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505
Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests	SME PAPER MR91-177 p 897 A92-45260 Advanced superalloys for turbine blade and vane applications ONERA, TP NO. 1992-2 p 893 A92-48578	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the
Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests AIAA PAPER 92-3364 p 905 A92-48937	[SME PAPER MR91-177] p 897 A92-45260 Advanced superalloys for turbine blade and vane applications	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the Euler equations
Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests AIAA PAPER 92-3364 p 905 A92-48937 Analysis of a hydrocarbon scramjet with augmented	SME PAPER MR91-177 p 897 A92-45260 Advanced superalloys for turbine blade and vane applications ONERA, TP NO. 1992-2 p 893 A92-48578 Manufacturing technology methodology for propulsion	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the Euler equations [AIAA PAPER 92-2646] p 796 A92-45513
Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests AIAA PAPER 92-3364 p 905 A92-48937 Analysis of a hydrocarbon scramjet with augmented preburning	SME PAPER MR91-177 p 897 A92-45260 Advanced superalloys for turbine blade and vane applications ONERA, TP NO. 1992-2 p 893 A92-48578 Manufacturing technology methodology for propulsion system parts AIAA PAPER 92-3525 p 906 A92-49048	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the Euler equations [AIAA PAPER 92-2646] p 796 A92-45513 Investigation of solution operators for the
Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984	SME PAPER MR91-177 p 897 A92-45260 Advanced superalloys for turbine blade and vane applications ONERA, TP NO. 1992-2 p 893 A92-48578 Manufacturing technology methodology for propulsion system parts p 896 A92-49048 Calculation of installation effects within performance	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the Euler equations [AIAA PAPER 92-2646] p 796 A92-45513 Investigation of solution operators for the three-dimensional Euler equations
Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests AIAA PAPER 92-3364 p 905 A92-48937 Analysis of a hydrocarbon scramjet with augmented preburning	SME PAPER MR91-177 p 897 A92-45260 Advanced superalloys for turbine blade and vane applications ONERA, TP NO. 1992-2 p 893 A92-48578 Manufacturing technology methodology for propulsion system parts AIAA PAPER 92-3525 p 906 A92-49048	Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 Shock fitting with a finite volume approximation to the Euler equations [AIAA PAPER 92-2646] p 796 A92-45513 Investigation of solution operators for the

p 870 N92-28686

static component reliability study [DOT/FAA/CT-91/10]

Naval aircraft/engine mission payoff analyses [AIAA PAPER 92-3473] p 865 A92-49019

p 798 A92-45523

| AIAA PAPER 92-2668 |

flows

Spatial and temporal adaptive procedures for the Commercial turbofan engine exhaust nozzle flow Thrust stand evaluation of engine performance unsteady aerodynamic analysis of airfoils using analyses using PAB3D improvement algorithms in an F-15 airplane unstructured meshes [AIAA PAPER 92-2701] p 801 A92-45543 [AIAA PAPER 92-3747] p 866 A92-49111 [AIAA PAPER 92-2694] p 800 A92-45540 Flight evaluation of an extended engine life mode on Prediction of a high bypass ratio engine exhaust nozzle A transonic/supersonic/hypersonic CFD analysis of the an F-15 airplane entry Space Shuttle Orbiter [NASA-TM-104240] | AIAA PAPER 92-3259 | p 864 A92-48855 p 871 N92-29659 [AIAA PAPER 92-2614] p 805 A92-45571 -16 AIRCRAFT A study on the impact of shroud geometry on ejector Application of the Euler method EUFLEX to a fighter-type Prismatic grid generation with an efficient algebraic pumping performance | AIAA PAPER 92-3260 | method for aircraft configurations airplane configuration at transonic speed p 864 A92-48856 [AIAA PAPER 92-2620] p 845 A92-45573 | AIAA PAPER 92-2721 | p 803 A92-45559 Scale model test results of a multi-slotted vectoring A fast, implicit unstructured-mesh Euler method F-16 failure detection isolation and estimation study 2DCD ejector nozzle p 917 A92-45589 p 876 A92-48490 IAIAA PAPER 92-26931 IAIAA PAPER 92-32641 p 864 A92-48859 A compact higher order Euler solver for unstructured Simple fly-by-wire actuator p 876 A92-48491 Experience in the operation of a hypersonic nozzle static grids with curved boundaries [AIAA PAPER 92-2696] Fighter airframe/propulsion integration - A General thrust stand p 807 A92-45590 Dynamics perspective p 882 A92-48881 [AIAA PAPER 92-3292] [AIAA PAPER 92-3332] An unstructured approach to the design of Specifying exhaust nozzle contours in real-time using Transport delay measurements: Methodology and analysis for the F-16C combat engagement trainer, the multiple-element airfoils [AIAA PAPER 92-2709] genetic algorithm trained neural networks p 807 A92-45592 [AIAA PAPER 92-3328] p 865 A92-48911 Predicted pressure distribution on a prop-fan blade display for advanced research and training, and the F-16A Emerging airframe/propulsion integration technologies through Euler analysis p 810 A92-46791 Temporal adaptive Euler/Navier-Stokes algorithm limited field of view at General Electric [AD-A248519] p 888 N92-29505 I AIAA PAPER 92-3335] p 850 A92-48917 involving unstructured dynamic meshes 18 AIRCRAFT p 812 A92-46887 p 880 A92-45266 **EXHAUST SYSTEMS** Water tunnels Gas turbine exhaust system silencing design Coupled numerical simulation of the external and engine Compact higher order characteristic-based Euler solver inlet flows for the F-18 at large incidence p 882 A92-47365 for unstructured grids p 812 A92-46889 p 793 A92-45493 Parallel computing strategies for block multigrid implicit [AIAA PAPER 92-2621] A computational study of advanced exhaust system Numerical investigation of tail buffet on F-18 aircraft p 812 A92-46894 solution of the Fuler equations. transition ducts with experimental validation [AIAA PAPER 92-2673] p 798 A92-45528 Taylor series approximation of geometric shape variation p 907 A92-49126 I AIAA PAPER 92-37941 p 899 A92-46916 for the Euler equations Unsteady pressure and load measurements on an Internal reversing flow in a tailpipe offtake configuration An Eulerian/Lagrangian method for computing F/A-18 vertical fin at high-angle-of-attack for SSTOVL aircraft p 814 A92-46952 [AIAA PAPER 92-2675] p 798 A92-45529 blade/vortex impingement p 868 N92-28418 [NASA-TM-105698] Initial validation of an unsteady Euler/Navier-Stokes flow Dynamic LEX/forebody vortex interaction effects EXPERIMENT DESIGN p 804 A92-45566 solver for helicopter rotor airloads in forward flight I AIAA PAPER 92-27321 Using design of experiments to improve product and p 815 A92-46956 Forebody flow control on a full-scale F/A-18 aircraft process integrity p 928 A92-48555 AIAA PAPER 92-2674 | p 806 A92-45583 Full-scale high angle-of-attack tests of an F/A-18 Mesh adaption for 2D transsonic Euler flows on [AIAA PAPER 92-2674] EXPERT SYSTEMS p 816 A92-47038 unstructured meshes Lessons learned about information management within Mesh adaptivity with the quadtree method [AIAA PAPER 92-2676] p 806 A92-45584 p 916 A92-44909 the Pilot's Associate program p 816 A92-47041 Navier-Stokes predictions for the F-18 wing and fuselage Specification of adaptive aiding systems - Information A finite difference solution of the Euler equations on p 810 A92-46783 at large incidence p 916 A92-44915 requirements for designers p 818 A92-47153 non-body-fitted Cartesian grids Statistical prediction of maximum buffet loads on the Wind-tunnel compressor stall monitoring using neural p 811 A92-46816 F/A-18 vertical fin Application of non-reflecting boundary conditions to p 918 A92-46817 Thrust vectoring characteristics of the F-18 high alpha three-dimensional Euler equation calculations for thick An explanation-based-learning approach to knowledge research vehicle at angles of attack from 0 to 70 deg compilation - A Pilot's Associate application [AIAA PAPER 92-3045] p 822 A92-48705 p 920 A92-48220 [AIAA PAPER 92-3095] p 877 A92-48737 Analysis of results of an Euler-equation method applied Use of high-fidelity simulation in the development of an An artificial intelligence approach for the verification of to leading-edge vortex flow F/A-18 active ground collision avoidance system requirements for aircraft electrical power systems p 827 N92-28657 INLR-TP-90368-U1 p 837 N92-28530 p 863 A92-48481 Development and validation of a characteristic boundary Identification of aerodynamic models for maneuvering The application of multimedia expert systems to the condition for a cell-centered Euler method depot level maintenance environment p 828 N92-28692 [NASA-CR-190444] p 852 N92-28720 INLR-TP-90144-U1 n 922 A92-48557 Boundary conditions for Euler equations at internal block Tasking and communication flows in the F/A-18D Expert systems for the trouble-shooting and the faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712 cockpit: Issues, problems, and possible solutions diagnostics of engines IAD-A2459771 p 853 N92-28802 [AIAA PAPER 92-3327] p 923 A92-48910 Parameter identification for nonlinear aerodynamic Spatial and temporal adaptive procedures for the Application of knowledge-based systems for diagnosis unsteady aerodynamic analysis of airfoils using systems of aircraft systems [NASA-CR-190264] unstructured meshes p 830 N92-29329 p 837 N92-28655 INLR-TP-90192-U1 **FABRICS** [NASA-TM-107635] p 831 N92-29445 **EXPLOSIONS EUROPÉAN AIRBUS** Performance of uncoated AFRSI blankets during Safety in the sky - Designing bomb-resistant baggage multiple Space Shuttle flights Assembling the future p 783 A92-44895 containers p 836 A92-47775 NASA-TM-103892] Centre for Flight Simulation Berlin Airbus 340 simulator p 890 N92-29104 Modular simulation of HEI fragments and blast for research and training p 880 A92-45028 Airbus A319 - Completion of the standard fuselage FAILURE ANALYSIS pressure [AD-A248205] A method of failure analysis of complicated structures p 910 N92-29191 p 848 A92-47591 p 901 A92-47656 **EXPLOSIVES** A340 handling, cockpit design improve on predecessor A failure analysis for landing gear structural system p 849 A92-47667 Airport X-ray screening technology becomes a viable A320 p 849 A92-47969 explosives detector p 836 A92-47925 **EVACUATING (TRANSPORTATION)** Approximate analysis for failure probability of structural EXTERNAL STORE SEPARATION The effect on aircraft evacuations of passenger ystems p 901 A92-47671 RTOK elimination with TSMM --- Rerurn Tested OK On the aerodynamics/dynamics of store separation from p 834 A92-44998 behaviour and smoke in the cabin hypersonic aircraft reproduction using time stress measurement module **EVALUATION** p 807 A92-45595 I AIAA PAPER 92-27221 Operational evaluation of a tower workstation for p 902 A92-48446 EXTERNAL STORES p 879 A92-44981 clearance delivery F-16 failure detection isolation and estimation study Calculation of unsteady subsonic and supersonic flow p 876 A92-48490 **EVAPORATION** about oscillating wings and bodies by new panel Microburst modelling and scaling p 915 A92-46262 Failure model development for an integrally bladed methods turbine wheel [NLR-TP-89119-U] p 827 N92-28659 The flip flop nozzle extended to supersonic flows p 865 A92-48979 [AIAA PAPER 92-3420] **EXTERNALLY BLOWN FLAPS** [AIAA PAPER 92-2724] p 803 A92-45561 Engine fan blade low cycle fatigue testing Large-scale wind tunnel studies of a jet-engined powered EXHAUST EMISSION [AIAA PAPER 92-3478] ejector-lift STOVL aircraft p 866 A92-49021 p 842 A92-45313 Applied analytical combustion/emissions research at the Assessment of valve actuator motor rotor degradation NASA Lewis Research Center by Fourier Analysis of current waveform [NASA-TM-105731] p 890 N92-29343 [DE92-013233] p 909 N92-28814 **EXHAUST FLOW SIMULATION** Tensile and interlaminar properties of GLARE (trade A scramjet nozzle experiment with hypersonic external F-104 AIRCRAFT name) laminates Airdata calibration techniques for measuring I AD-A2501881 p 895 N92-28921 p 856 A92-46792 [AIAA PAPER 92-3289] p 864 A92-48878 atmospheric wind profiles Performance of fuselage pressure structure **EXHAUST GASES** F-111 AIRCRAFT p 913 N92-30109 Configuration effects on the ingestion of hot gas into Reduction and analysis of F-111C flight data p 842 A92-45315 Fracture mechanics research at NASA related to the the engine intake p 853 N92-28771 AD-A250341] aging commercial transport fleet p 913 N92-30110 A simplified reaction mechanism for prediction of NO(x) F-15 AIRCRAFT Preliminary results on the fracture analysis of multi-site emissions in the combustion of hydrocarbons Verification and validation of F-15 and S/MTD unique p 921 A92-48515 cracking of lap joints in aircraft skins I AIAA PAPER 92-3340] p 894 A92-48919

Subsonic flight test evaluation of a performance seeking

Subsonic flight test evaluation of a propulsion system

parameter estimation process for the F100 engine

p 878 A92-49109

p 866 A92-49110

control algorithm on an F-15 airplane

[AIAA PAPER 92-3743]

AIAA PAPER 92-37451

p 913 N92-30111

p 913 N92-30112

p 785 A92-47670

Current DOT research on the effect of multiple site

Economic life analysis for replacing components

damage on structural integrity

FAILURE MODES

EXHAUST NOZZLES

of a vectored thrust STOVL concept

ventral nozzles for ASTOVL aircraft

Hot gas ingestion characteristics and flow visualization

Experimental and analytical study of close-coupled

p 860 A92-45316

p 861 A92-45325

Approximate analysis for failure probability of structural systems p 901 A92-47671	The design of test-section inserts for higher speed aeroacoustic testing in the Ames 80- by 120-foot wind	Aviation, motor, and space development in U.S.S.R.
Assessment of valve actuator motor rotor degradation	tunnel	Prediction of inviscid supe
by Fourier Analysis of current waveform	[NASA-TM-103915] p 927 N92-28909 European studies to investigate the feasibility of using	flowfields
DE92-013233 p 909 N92-28814 FALKNER-SKAN EQUATION	1000 ft vertical separation minima above FL 290. Part 1:	Maximizing thrust-vectoring of metrics
Simplified linear stability transition prediction method for	Overview of organisation, techniques employed, and	Design load predictions on a
separated boundary layers p 812 A92-46883 FAN BLADES	conclusions [NLR-TP-91062-U-PT-1] p 841 N92-29605	• .
Finite elements analysis of flexural edge wave for	FEEDBACK CONTROL	Generation of efficient multible
composite fan blades	Robust discrete controller design for an unmanned	computations Dawn of stealth
SAE PAPER 912048 p 861 A92-45432 Engine fan blade low cycle fatigue testing	research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495	The Tonopah years
[AIAA PAPER 92-3478] p 866 A92-49021	Compensating for manufacturing and life-cycle	The airplane F-117 aircraft
FASTENERS	variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139	Identifying design requirement structures
The role of nonmetallic fasteners in aircraft wings and other composite structures p 784 A92-47413	Dynamic control of aerodynamic instabilities in gas	Aerodynamic performance of
Use of adhesive bonded attachments for a composite	turbine engines p 870 N92-28466	system in a STOVL fighter aircr
aircraft fuel tank p 785 A92-47414 FATIGUE (MATERIALS)	Superconducting bearings with levitation control configurations	[AIAA PAPER 92-3094] Computational icing analysis
Contribution of individual load cycles to crack growth	[NASA-CASE-GSC-13346-1] p 909 N92-29099	(AIAA PAPER 92-3178)
under aircraft spectrum loading p 891 A92-45236	Feedback control laws for highly maneuverable aircraft	Fighter airframe/propulsion
Strength evaluation and safety of machine/structure. III - Case examples on strength and safety evaluation of	[NASA-CR-190535] p 879 N92-29654	Dynamics perspective [AIAA PAPER 92-3332]
machine/structure 3.2 aircraft (airframe)	FERROELECTRICITY	Fighter airframe/propulsion in
p 882 A92-47303	Ferroelectric memory evaluation and development system p 902 A92-48460	Aircraft perspective
Numerical analysis of an engine turbine disk loaded with a large number of thermomechanical cycles	FIBER COMPOSITES	[AIAA PAPER 92-3333] A computational study of ac
[ONERA, TP NO. 1992-31] p 902 A92-48592	The relationship between tensile and flexural strength	transition ducts with experiment
Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs	of unidirectional composites p 891 A92-45629 Axial alignment of short-fiber titanium aluminide	[AIAA PAPER 92-3794] The role of simulation for th
[AD-A250390] p 854 N92-29180	composites by directional solidification	support by synthetic imagery)
Maintaining the safety of an aging fleet of aircraft	p 892 A92-46838	Application of piloted simulati
p 837 N92-30108 Fracture mechanics research at NASA related to the	Wing leading edge design with composites to meet bird strike requirements p 848 A92-47404	flight-dynamics research for figh
aging commercial transport fleet p 913 N92-30110	Tensile and interlaminar properties of GLARE (trade	Flow visualization studies
Preliminary results on the fracture analysis of multi-site	name) laminates [AD-A250188] p 895 N92-28921	canard-configured X-31A-Like fi
cracking of lap joints in aircraft skins p 913 N92-30111	FIBER OPTICS	[AD-A245940] FILAMENT WINDING
Aging commuter aeroplanes: Fatigue evaluation and	LDV measurements on a rectangular wing with a	Filament winding of com
control methods p 915 N92-30132 FATIGUE LIFE	simulated glaze ice accretion {AIAA PAPER 92-2690] p 800 A92-45537	structures FILM COOLING
Advances in fatigue lifetime predictive techniques;	A high-performance LLLTV CCD camera for nighttime	The flow pattern and external
Proceedings of the Symposium, San Francisco, CA, Apr.	pilotage p 855 A92-46227	for gas turbine vanes end surfa-
24, 1990 [ASTM STP-1122] p 896 A92-45226	Fibre optic rotary position sensors for vehicle and propulsion controls p 855 A92-46243	(AIAA PAPER 92-3071) Numerical simulation of turb
The fatigue scatter factors and reduction factors in the	Fiber optic controls for aircraft engines - Issues and	using film cooling
design of aircraft and helicopter's structural lives	implications p 856 A92-46244	[AIAA PAPER 92-3309]
[SAE PAPER 911984] p 843 A92-45387 The large scale test control systems designed and built	Potential for integrated optical circuits in advanced aircraft with fiber optic control and monitoring systems	FINITE DIFFERENCE THEORY Numerical simulation of aeroth
by the Boeing Company to support the 757 and 767 major	p 856 A92-46246	engine inlets due to shock impli
fatigue tests SAE PAPER 911985 p 881 A92-45388	Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990	[AIAA PAPER 92-2605]
[SAE PAPER 911985] p 881 A92-45388 Probability analysis of structure failure for the wings with	(SPIE-1367) p 901 A92-48026	Prediction of laminar bour splines
main and subordinate components p 848 A92-47657	Fiber-optic position transducers for aircraft controls	[AIAA PAPER 92-2702]
A study on crack initiation method for durability analysis p 901 A92-47663	p 857 A92-48041 Application of analog fiber optic position sensors to flight	Two-stream, supersonic, wak base. I - General features
Aero mechanics in the twenty-first century	control systems p 857 A92-48042	A finite difference solution o
[AIAA PAPER 92-3194] p 863 A92-48805	Multi-analog track fiber coupled position sensor p 857 A92-48043	non-body-fitted Cartesian grids
Failure model development for an integrally bladed turbine wheel	Wavelength encoded fiber optic angular displacement	FINITE ELEMENT METHOD Impact response of compos
[AIAA PAPER 92-3420] p 865 A92-48979	sensor p 857 A92-48046	[SAE PAPER 912046]
A sensitivity analysis on component reliability from	Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047	Finite elements analysis of composite fan blades
fatigue life computations [AD-A247430] p 908 N92-28425	Making fly-by-light a reality p 877 A92-48499	[SAE PAPER 912048]
Short cracks and durability analysis of the Fokker 100	Optics in aircraft engines p 926 A92-48500	Ritz vectors synthesis ver
wing/fuselage structure [NLR-TP-90336-U] p 910 N92-29603	Absolute fiber optic pressure transducer for aircraft air data measurement p 858 A92-48501	fluid-structure interaction model A general purpose nonlinear
Aging aircraft NDI Development and Demonstration	Design issues in a fiber optic sensor system architecture	element for application to rotary
Center (AANC): An overview nondestructive	for aircraft engine control [AIAA PAPER 92-3483] p 866 A92-49023	97 t t-P
inspection p 915 N92-30120 Ageing airplane repair assessment program for Airbus	Multi-channel fiber optic rotary joint for single-mode	Bilinear formulation applied to of helicopter rotor blade
A300 p 838 N92-30123	fiber	Periodic trim solutions with h
FATIGUE TESTS The large scale test central quetems designed and built	[AD-D015273] p 927 N92-29095 FIBER ORIENTATION	in time Sensitivity of tire response to
The large scale test control systems designed and built by the Boeing Company to support the 757 and 767 major	The relationship between tensile and flexural strength	geometric parameters
fatigue tests	of unidirectional composites p 891 A92-45629	Numerical analysis of an engir
[SAE PAPER 911985] p 881 A92-45388 Strength evaluation and safety of machine/structure. III	FIGHTER AIRCRAFT Specification of adaptive aiding systems - Information	a large number of thermomecha [ONERA, TP NO. 1992-31]
- Case examples on strength and safety evaluation of	requirements for designers p 916 A92-44915	Prediction of gas turbine co
machine/structure 3.2 aircraft (airframe)	A USAF assessment of STOVL fighter options p 842 A92-45310	element code
p 882 A92-47303 Engine fan blade low cycle fatigue testing	Ground surface erosion - British Aerospace test facility	[AIAA PAPER 92-3469] Practical architecture of design
[AIAA PAPER 92-3478] p 866 A92-49021	and experimental studies p 881 A92-45323	aircraft structures taking the Mi
Inspection of aging aircraft: A manufacturer's perspective p 914 N92-30117	Development of the DDV actuation system on the IDF aircraft	example
perspective p 914 N92-30117 FAULT TOLERANCE	[SAE PAPER 912080] p 844 A92-45455	Nonlinear analyses of compo in sonic fatigue
Applying advanced digital simulation techniques in	Dynamically enhanced sustained lift using oscillating	[NASA-CR-190565]
designing fault tolerant systems p 921 A92-48489 FAULT TREES	leading-edge flaps [AIAA PAPER 92-2625] p 794 A92-45497	FINITE VOLUME METHOD Application of an unstructured
Developing intelligent automatic test equipment	Application of the Euler method EUFLEX to a fighter-type	multi-element airfoils operating

airplane configuration at transonic speed

Prediction of leading-edge vortex breakdown on a delta

[AIAA PAPER 92-2620]

wing oscillating in roll [AIAA PAPER 92-2677]

p 845 A92-45573

p 807 A92-45585

[AIAA PAPER 92-2646]

p 922 A92-48569

FEASIBILITY ANALYSIS

Feasibility study of hypersonic clinometric measurements at R3Ch

[ONERA-RSF-136/1865-AY-728-] p 829 N92-28789

designs --- research and p 784 A92-46202 ersonic/hypersonic aircraft p 810 A92-46785 control power and agility p 874 A92-46794 fighter-like aircraft wing p 811 A92-46797 ock grids for Navier-Stokes p 919 A92-47081 p 785 A92-47757 p 785 A92-47758 p 849 A92-47759 nts using integrated analysis p 922 A92-48527 a full-scale lifting ejector p 824 A92-48738 for aircraft inlets p 836 A92-48793 in integration - A General p 850 A92-48915 integration - A McDonnell p 850 A92-48916 dvanced exhaust system tal validation p 907 A92-49126 ne study of APIS (piloting p 885 N92-28544 ion to high-angle-of-attack hter aircraft p 886 N92-28551 of a sideslipping, fighter aircraft model p 829 N92-28883 nposite isogrid fuselage p 784 A92-47405 heat transfer investigation p 903 A92-48722 bine 'hot spot' alleviation p 904 A92-48896 hermal loads in hypersonic ngement p 792 A92-45482 ndary layer using cubic p 801 A92-45544 ce flowfield behind a thick p 813 A92-46895 of the Euler equations on p 818 A92-47153 site UHB propeller blades p 861 A92-45430 flexural edge wave for p 861 A92-45432 rsus modal synthesis for ling p 898 A92-45885 rigid body mass finite wing dynamics p 846 A92-46924 the stability and response p 847 A92-46930 p-version finite elements p 874 A92-46931 variations in material and p 900 A92-47128 ne turbine disk loaded with anical cycles p 902 A92-48592 ombustor flow by a finite p 906 A92-49016 n optimisation software for IBB-Lagrange code as an p 851 N92-28471 site aerospace structures p 854 N92-30209 ed Navier-Stokes solver to multi-element airfoils operating at transonic maneuver conditions [AIAA PAPER 92-2638] p 796 A92-45507 Shock fitting with a finite volume approximation to the Euler equations

p 796 A92-45513

FINS SUBJECT INDEX

LU-SGS implicit scheme for entry vehicle flow ty cycles --- in p 877 A92-48494 p 877 A92-48499 Specifying exhaust nozzle contours in real-time using Electric actuation system duty computation and comparison with aerodynamic data genetic algorithm trained neural networks fly-by-wire/power-by-wire control p 798 A92-45526 p 865 A92-48911 [AIAA PAPER 92-2671] [AIAA PAPER 92-3328] Making fly-by-light a reality Prediction of the viscous transonic aerodynamic FLEXIBLE WINGS Verification and validation of F-15 and S/MTD unique performance of supercritical aerofoil sections Integrated aeroservoelastic wing synthesis by nonlinear software n 921 A92-48515 AIAA PAPER 92-2653 | p 805 A92-45569 Application of the Euler method EUFLEX to a tighter-type | AIAA PAPER 92-2653| concept for modular programming/approximation concepts Partitioned software support p 922 A92-48518 p 873 A92-46752 embedded computer software airplane configuration at transonic speed Comparative investigation of multiplane thrust vectoring Navier-Stokes computations on swept-tapered wings, p 845 A92-45573 [AIAA PAPER 92-2620] including flexibility p 810 A92-46786 p 864 A92-48858 LAIAA PAPER 92-32631 A compact higher order Euler solver for unstructured Dynamic analysis of rotor flex-structure based on Utility of ground simulation in flight control problem grids with curved boundaries nonlinear anisotropic shell models p 899 A92-46946 [AIAA PAPER 92-2696] p 807 A92-45590 identification, solution development, and verification FLIGHT ALTITUDE Compact higher order characteristic-based Euler solver p 883 N92-28525 Who or what saved the day? A comparison of traditional p 812 A92-46889 for unstructured grids Flight simulation and digital flight controls p 833 A92-44931 and glass cockpits p 884 N92-28526 3-D numerical grid generation for the transonic flow Selected models of aircraft navigation space analysis about multi-bodies p 817 A92-47061 A time marching method in finite volume for transonic The application of flight simulation models in support p 839 A92-45373 of rotorcraft design and development p 884 N92-28527 diffuser turbulent flows p 819 A92-47690 Oscillations of balloon-flight altitude p 836 A92-46660 Characteristics of the Shuttle Orbiter leeside flow during Use of high-fidelity simulation in the development of an FLIGHT CHARACTERISTICS F/A-18 active ground collision avoidance system a reentry condition p 837 N92-28530 [AIAA PAPER 92-2951] p 821 A92-47915 Selected models of aircraft navigation space Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement p 839 A92-45373 Use of simulation in the USAF Test Pilot School Mathematical modeling of the effect of windshear on curriculum p 884 N92-28535 p 908 N92-28712 Full mission simulation: A view into the future INLR-TP-90134-UI the dynamics of a landing aircraft D 875 A92-47784 Development of a multigrid transonic potential flow code Aircraft stabilization at large angles of attack p 884 N92-28537 p 875 A92-47785 p 786 A92-47971 for cascades Use of a research simulator for the development of new [NASA-CR-190480] p 885 N92-28543 p 830 N92-29361 concepts of flight control B-1B excels in conventional role Methods for direct simulation of transition in hypersonic The role of systems simulation for the development and Summary of the effects of engine throttle response on p 912 N92-30064 qualification of ATTAS p 886 N92-28548 boundary layers 2 airplane formation-flying qualities Effects of cockpit lateral stick characteristics on handling p 877 A92-48902 (AIAA PAPER 92-3318) Unsteady pressure and load measurements on an NPSNET: Flight simulation dynamic modeling using qualities and pilot dynamics F/A-18 vertical fin at high-angle-of-attack INASA-CR-44431 o 878 N92-28584 quaternions p 798 A92-45529 [AIAA PAPER 92-2675] Stability and control flight testing of a half-scale Pioneer IAD-A2474841 p 923 N92-28245 Statistical prediction of maximum buffet loads on the remotely piloted vehicle Flight simulation and digital flight controls F/A-18 vertical fin p 811 A92-46816 p 884 N92-28526 LAD-A2459731 n 879 N92-28801 A field repair of advanced helicopter vertical fin Rotorcraft In-Flight Simulation Research at NASA Ames Effects of cockpit lateral stick characteristics on handling p 785 A92-47417 Research Center: A Review of the 1980's and plans for structure qualities and pilot dynamics The optimization of variable cross-section spines with INASA-CR-44431 p 878 N92-28584 the 1990's In-flight simulation studies at the NASA Dryden Flight [NASA-TM-103873] temperature dependent thermal parameters p 853 N92-28926 p 901 A92-48353 In-flight simulation studies at the NASA Dryden Flight Research Facility The effect of tip convection on the performance and INASA-TM-43961 p 853 N92-29110 Research Facility optimum dimensions of cooling fins (NASA-TM-4396) p 902 A92-48354 FLIGHT CONDITIONS p 853 N92-29110 The A320 laminar fin programme Effects of bleed air extraction on thrust levels on the Practical considerations in designing the engine cycle F404-GE-400 turbofan engine [ONERA, TP NO. 1992-23] p 849 A92-48586 p 869 N92-28460 Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating FIRE CONTROL NASA-TM-104247 p 871 N92-29425 FLIGHT CREWS Use of high-fidelity simulation in the development of an Scenario analysis of thigh gap related ejection injuries F/A-18 active ground collision avoidance system environment p 837 N92-28530 [NASA-TM-103925] p 852 N92-28721 p 834 A92-44995 FIRE PREVENTION FLIGHT CONTROL The effectiveness of training programs for preventing Modular simulation of HEI fragments and blast Toward an integrated multimodal approach to flight p 834 A92-44997 aircrew 'error Full model simulation of the National Airspace System p 880 A92-45026 simulation [AD-A248205] p 910 N92-29191 Jet-powered V/STOL aircraft - Lessons learned Research and training platform p 880 A92-45042 , problems, and FITTINGS Rejected takeoffs - Causes, p 841 A92-45304 Reduction and analysis of F-111C flight data consequences p 835 A92-45052 A progress report on ASTOVL control concept studies p 853 N92-28771 [AD-A250341] under the VAAC programme p 871 A92-45319 Aircraft Command in Emergency Situations (ACES) FIXED WINGS [SAE PAPER 912039] p 835 A92-45424 Integrated flight/propulsion control for supersonic Aircraft route optimization using adaptive simulated nnealing p 922 A92-48565 Assessment of one-dimensional icing forecast model p 872 A92-45320 STOVL aircraft applied to stratiform clouds International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, p 915 A92-46803 annealing FLAME PROPAGATION An analysis of aircrew communication patterns and Oct. 7-11, 1991, Proceedings Waves and thermodynamics in high Mach number content [AD-A246618] propulsive ducts p 809 A92-46431 ISAE P-2461 p 783 A92-45376 p 907 N92-28253 Avionics flight systems for the 21st century

APP PAPER 912033 p 784 A92-45421 Numerical simulations of the transdetonative ram Use of a commercially available flight simulator during accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 aircrew performance testing [AD-A245922] [SAE PAPER 912033] Functional mock-up tests for flight control system of the p 883 N92-28407 FLIGHT ENVELOPES FLAMMABILITY NAL QSTOL research aircraft 'ASKA' A study of the flammability limit of the backward facing [SAE PAPER 912036] p 881 A92-45422 Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92step flow combustion A simulator study of a flight reference display for p 783 A92-45407 AIAA PAPER 92-3846] p 895 A92-49136 FLIGHT HAZARDS powered-lift STOL aircraft **FLAPPING** [SAE PAPER 912067] p 855 A92-45449 Real targets, unreal displays suppression of critical radar data The inadvertent On the adequacy of modeling turbulence and related p 839 A92-44969 Manual control of vehicles with time-varying dynamics SAE PAPER 912078) p 917 A92-45454 effects on helicopter response FLAPS (CONTROL SURFACES) p 847 A92-46945 Eliminating pilot-caused altitude deviations - A human [SAE PAPER 912078] A new milestone in automatic aircraft control - Fly-by-light octors approach p 834 A92-45041
On the possibility of freezing and sticking phenomena factors approach Rejected takeoffs - Causes, problems. and systems transmit commands optoelectronically p 835 A92-45052 p 784 A92-45699 in a transport during the ground taxiing and takeoff run Computational evaluation of an airfoil with a Gurney Fibre optic rotary position sensors for vehicle and and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 propulsion controls p 855 A92-46243 [AIAA PAPER 92-2708] p 802 A92-45550 FLIGHT INSTRUMENTS The method of determinant equations in the applied Separation control on high multi-element airfoils theory of optimal systems - Systems with 'rigid' constraints and with fixed boundary conditions p 917 A92-46629 Reynolds number Through the looking glass --- effectiveness of electronic flight instrument systems p 856 A92-46449 [AIAA PAPER 92-2636] p 806 A92-45575 FLIGHT MECHANICS inversion flight control Nonlinear for supermaneuverable aircraft p 873 A92-46751 Symptom of payload-induced flight instability p 873 A92-46761 Periodic trim solutions with hp-version finite elements p 874 A92-46931 Two variations of certainty control Flow gradient corrections on hot-wire measurements A Mach-scaled powered model for rotor-fuselage p 918 A92-46762 using an X-wire probe [NLR-TP-90255-U] interactional aerodynamics and flight mechanics investigations p 847 A92-46960 Application of analog fiber optic position sensors to flight p 829 N92-28713 p 857 A92-48042 control systems Mathematical modeling of the flight of passenger aircraft FLAT PLATES Nonlinear control design for slightly nonminimum phase Experimental development of spanwise vortex models p 875 A92-47777 in the case of engine failure systems - Application to V/STOL aircraft with streamwise decay due to wall interaction FLIGHT OPERATIONS p 876 A92-48160 p 799 A92-45535 | AIAA PAPER 92-2688 | Aircraft ship operations The propulsive-only flight control problem Viscous flow past a nacelle isolated and in proximity p 876 A92-48487 IAGARD-AR-3121 p 850 N92-28468 The evaluation of simulator effectiveness for the training of a flat plate F-16 failure detection isolation and estimation study [AIAA PAPER 92-2723] p 803 A92-45560 p 876 A92-48490 of high speed, low level, tactical flight operations FLEXIBLE BODIES p 885 N92-28539 Variable displacement electro-hydrostatic actuator --- for Finite elements analysis of flexural edge wave for p 876 A92-48492 FLIGHT PATHS flight control systems composite fan blades C-141 and C-130 power-by-wire flight control systems Eliminating pilot-caused altitude deviations - A human ISAE PAPER 9120481 p 861 A92-45432 p 876 A92-48493 factors approach p 834 A92-45041

SUBJECT INDEX

Reconstruction of flight path in turbulence p 874 A92-46777	Rotorcraft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for	In-flight simulation of backside operating models using direct lift controller
Aircraft route optimization using adaptive simulated	the 1990's	[SAE PAPER 912069] p 872 A92-45450
annealing p 922 A92-48565	[NASA-TM-103873] p 853 N92-28926	Concepts for the stability analysis of NLF-experiments
FLIGHT PLANS	In-flight simulation studies at the NASA Dryden Flight Research Facility	on swept wings
Empirical foundations and sensitivity testing - Is it enough	[NASA-TM-4396] p 853 N92-29110	[AIAA PAPER 92-2706] p 801 A92-45548
for the 90's? p 835 A92-45054	Transport delay measurements: Methodology and	Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794
FLIGHT RECORDERS Double Density recording acquisition and playback	analysis for the F-16C combat engagement trainer, the	Frequency domain flight testing and analysis of an
p 920 A92-47534	display for advanced research and training, and the F-16A	OH-58D helicopter p 847 A92-46943
LIGHT SAFETY	limited field of view	24-bit flight test data recording format
EICAS in an integrated cockpit Engine Indication Crew	[AD-A248519] p 888 N92-29505 Results of a flight simulator experiment to establish	p 900 A92-47528
Alerting System p 855 A92-44922	handling quality guidelines for the design of future transport	New Boeing flight test data acquisition systems
Who or what saved the day? A comparison of traditional	aircraft	p 920 A92-47537
and glass cockpits p 833 A92-44931	[NLR-MP-88044-U] p 854 N92-29616	Robust discrete controller design for an unmanned
Judgement training for Alaskan pilots	Assessment of army aviators' ability to perform individual	research vehicle (URV) using discrete quantitative
p 835 A92-45048	and collective tasks in the aviation networked simulator	feedback theory p 877 A92-48495 Summary of the effects of engine throttle response on
ICAO Flight Safety and Human Factors Programme p 835 A92-45055	[AD-A250293] p 888 N92-29709 Experience with piloted simulation in the development	airplane formation-flying qualities
Getting test items to measure knowledge at the level	of helicopters	[AIAA PAPER 92-3318] p 877 A92-48902
of complexity which licensing authorities desire - Another	[MBB-UD-0610-91-PUB] p 889 N92-30076	Subsonic flight test evaluation of a performance seeking
dimension to test validity p 835 A92-45080	FLIGHT SIMULATORS	control algorithm on an F-15 airplane
A simulator study of a flight reference display for	The development of a real time visual flight simulator	[AIAA PAPER 92-3743] p 878 A92-49109
powered-lift STOL aircraft	for tactical operations research and measurement p 880 A92-45027	Subsonic flight test evaluation of a propulsion system
[SAE PAPER 912067] p 855 A92-45449 European studies to investigate the feasibility of using	A simulator study of a flight reference display for	parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110
1000 ft vertical separation minima above FL 290. Part 1:	powered-lift STOL aircraft	Operational noise data for OH-58D Army helicopters
Overview of organisation, techniques employed, and	[SAE PAPER 912067] p 855 A92-45449	[AD-A246822] p 926 N92-28292
conclusions	Analysis of the VISTA longitudinal simulation capability	Aircraft ship operations
[NLR-TP-91062-U-PT-1] p 841 N92-29605	for a cruise flight condition p 876 A92-48488	[AGARD-AR-312] p 850 N92-28468
On the optimization of windshear warning and guidance	Use of a commercially available flight simulator during aircrew performance testing	Use of high-fidelity simulation in the development of an
systems [NLR-TP-90196-U] p 837 N92-29703	[AD-A245922] p 883 N92-28407	F/A-18 active ground collision avoidance system p 837 N92-28530
FLIGHT SIMULATION	Piloted Simulation Effectiveness	Validation of simulation systems for aircraft acceptance
Toward an integrated multimodal approach to flight	[AGARD-CP-513] p 786 N92-28522	testing p 852 N92-28531
simulation p 880 A92-45026	Opportunities for flight simulation to improve operational	Use of simulation in the USAF Test Pilot School
Centre for Flight Simulation Berlin Airbus 340 simulator	effectiveness p 883 N92-28523	curriculum p 884 N92-28535
for research and training p 880 A92-45028	Piloted simulation effectiveness development applications and limitations p 883 N92-28524	An evaluation of IFR approach techniques: Generic
Knowledge-sensitive task manipulation - Acquiring knowledge from pilots flying a motion-based flight	Utility of ground simulation in flight control problem	helicopter simulation compared with actual flight p 886 N92-28550
simulator p 916 A92-45064	identification, solution development, and verification	S-76B certification for vertical take-off and landing
ASTOVL propulsion systems configuration and concept	p 883 N92-28525	operations from confined areas
choice p 842 A92-45312	Flight simulation and digital flight controls	[NLR-TP-90286-U] p 852 N92-28714
A progress report on ASTOVL control concept studies	p 884 N92-28526	Reduction and analysis of F-111C flight data
under the VAAC programme p 871 A92-45319 In-flight simulation of backside operating models using	The application of flight simulation models in support of rotorcraft design and development	[AD-A250341] p 853 N92-28771 Stability and control flight testing of a half-scale Pioneer
direct lift controller	p 884 N92-28527	remotely piloted vehicle
[SAE PAPER 912069] p 872 A92-45450	Experience with piloted simulation in the development	[AD-A245973] p 879 N92-28801
Flight model for unmanned simulated helicopters	of helicopters p 884 N92-28528	Aerodynamic characteristics obtained from alpha sweep
p 874 A92-46776	Use of simulation in the USAF Test Pilot School	test of the quiet STOL experimental aircraft ASKA
Establishing a database for flight in the wakes of	curriculum p 884 N92-28535 AM-X flight simulator from engineering tool to training	(NAL-TR-1112) p 853 N92-28901
structures p 810 A92-46782 NPSNET: Flight simulation dynamic modeling using	device p 884 N92-28536	A rotorcraft flight database for validation of vision-based ranging algorithms
quaternions	Full mission simulation: A view into the future	[NASA-TM-103906] p 841 N92-29103
[AD-A247484] p 923 N92-28245	p 884 N92-28537	Flight evaluation of an extended engine life mode on
Piloted Simulation Effectiveness	The evaluation of simulator effectiveness for the training	an F-15 airplane
[AGARD-CP-513] p 786 N92-28522	of high speed, low level, tactical flight operations p 885 N92-28539	[NASA-TM-104240] p 871 N92-29659
Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523	Harrier GR MK 5/7 mission simulators for the Royal	FLIGHT TIME Time-to-go estimation from infrared images
Piloted simulation effectiveness development	Air Force p 885 N92-28540	p 840 A92-48308
applications and limitations p 883 N92-28524	Use of a research simulator for the development of new	FLIGHT TRAINING
Utility of ground simulation in flight control problem	concepts of flight control p 885 N92-28543	Centre for Flight Simulation Berlin Airbus 340 simulator
identification, solution development, and verification	The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545	for research and training p 880 A92-45028
p 883 N92-28525	research: A new assessment p 885 N92-28545 Initial validation of a R/D simulator with large amplitude	The Tonopah years p 785 A92-47758
Flight simulation and digital flight controls p 884 N92-28526	motion p 886 N92-28546	Piloted Simulation Effectiveness [AGARD-CP-513] p 786 N92-28522
The application of flight simulation models in support	The use and effectiveness of piloted simulation in	Opportunities for flight simulation to improve operational
of rotorcraft design and development	transport aircraft research and development	effectiveness p 883 N92-28523
p 884 N92-28527	p 886 N92-28549	Piloted simulation effectiveness development
Experience with piloted simulation in the development	An evaluation of IFR approach techniques: Generic helicopter simulation compared with actual flight	applications and limitations p 883 N92-28524
of helicopters p 884 N92-28528 Validation of simulation systems for aircraft acceptance	p 886 N92-28550	Utility of ground simulation in flight control problem identification, solution development, and verification
testing p 852 N92-28531	Effective cueing during approach and touchdown:	p 883 N92-28525
Aircraft simulation and pilot proficiency: From surrogate	Comparison with flight p 886 N92-28552	Aircraft simulation and pilot proficiency: From surrogate
flying towards effective training p 884 N92-28532	Rotorcraft In-Flight Simulation Research at NASA Ames	flying towards effective training p 884 N92-28532
The use of a dedicated testbed to evaluate simulator	Research Center: A Review of the 1980's and plans for	Transport delay measurements: Methodology and
training effectiveness p 884 N92-28533	the 1990's	analysis for the F-16C combat engagement trainer, the
Use of simulation in the USAF Test Pilot School curriculum p 884 N92-28535	[NASA-TM-103873] p 853 N92-28926	display for advanced research and training, and the F-16A limited field of view
AM-X flight simulator from engineering tool to training	Experience with piloted simulation in the development of helicopters	[AD-A248519] p 888 N92-29505
device p 884 N92-28536	[MBB-UD-0610-91-PUB] p 889 N92-30076	FLOQUET THEOREM
The role of simulation for the study of APIS (piloting	FLIGHT TEST INSTRUMENTS	Computational aspects of helicopter trim analysis and
support by synthetic imagery) p 885 N92-28544	Potential applications of laser Doppler anemometry for	damping levels from Floquet theory p 875 A92-46933
The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545	in-flight measurements	FLOW COEFFICIENTS Total losses in turbulent flows inside conical diffusers
Initial validation of a R/D simulator with large amplitude	[NLR-TP-90163-U] p 859 N92-28654	p 819 A92-47782
motion p 886 N92-28546	FLIGHT TEST VEHICLES	FLOW DEFLECTION
The use and effectiveness of piloted simulation in	The role of systems simulation for the development and	Experimental and analytical study of close-coupled
transport aircraft research and development	qualification of ATTAS p 886 N92-28548 FLIGHT TESTS	ventral nozzles for ASTOVL aircraft p 861 A92-45325
p 886 N92-28549	remain legig	FLOW DISTORTION
Application of piloted simulation to high-angle-of-attack	ASTOVL propulsion systems configuration and concept	language mothers for anti-street at the
	ASTOVL propulsion systems configuration and concept choice p 842 A92-45312	Improved method for estimation of the maximum instantaneous distortion values
flight-dynamics research for fighter aircraft p 886 N92-28551		instantaneous distortion values
flight-dynamics research for fighter aircraft	choice p 842 A92-45312	

FLOW DISTRIBUTION SUBJECT INDEX

FLOW DISTRIBUTION

Simultaneous imaging and interferometric turbule visualization in a high-velocity mixing/shear layer

p 896 A92-45130 Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 The experimental and computational study of jet

impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled

ventral nozzles for ASTOVL aircraft p 861 A92-45325 Computational fluid dynamics applications in airplane cabin ventilation system design

ISAE PAPER 9119921 p 788 A92-45394 Flow field around thick delta wing with rounded leading edge

[SAE PAPER 912009] p 789 A92-45409 Experimental investigation of the flowfield of an oscillating airfoil

p 793 A92-45494 [AIAA PAPER 92-2622] Measurements of the velocity and vorticity fields around a pitching airfoil

p 794 A92-45498 I AIAA PAPER 92-26261 Numerical study on a supersonic open cavity flow with geometric modification of aft bulkhead

[AIAA PAPER 92-2627] p 794 A92-45499 Static and dynamic flow field development about a porous suction surface wing

p 795 A92-45500 [AIAA PAPER 92-2628] A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations

[AIAA PAPER 92-2643] p 796 A92-45510 Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct [AIAA PAPER 92-2699] p 800 A92-45541 The flip flop nozzle extended to supersonic flows

[AIAA PAPER 92-2724] p 803 A92-45561 Computation of turbulent flow about cone-derived

waverider [AIAA PAPER 92-2726] p 804 A92-45562

Surface and flow field measurements in a symmetric crossing shock wave/turbulent boundary layer flow [AIAA PAPER 92-2634] p 806 A92-45574

Comparison of two flux splitting schemes for calculation of ogive-cylinder at M = 3.5 and alpha = 18 deg [AIAA PAPER 92-2667] p 806 A92-45582

On the aerodynamics/dynamics of store separation from hypersonic aircraft

p 807 A92-45595 [AIAA PAPER 92-2722] Effect of flow rate on loss mechanisms in a backswept entrifugal impeller p 897 A92-45606 centrifugat impetter Navier-Stokes predictions for the F-18 wing and fuselage

p 810 A92-46783 at large incidence Prediction of inviscid supersonic/hypersonic aircraft p 810 A92-46785 Flight deck aerodynamics of a nonaviation ship

p 810 A92-46790 The application of particle image velocimetry (PIV) in a

short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825

Interaction between crossing oblique shocks and a p 812 A92-46882 turbulent boundary layer Joint computational/experimental aerodynamics research on hypersonic vehicle. II - Computational

p 812 A92-46891 Interaction between a rotor tip vortex and a separated p 814 A92-46947 flowfield

Efficient high-resolution rotor wake calculations using p 814 A92-46951 flow field reconstruction Grid sensitivity in low Reynolds number hypersonic

p 817 A92-47057 continuum flows grid generation wing-body-engine-pylon configurations

p 817 A92-47060 Simple diagnosis for the quality of generated grid

systems p 919 A92-47069 Enhancements to viscous-shock-layer technique

p 820 A92-47873 JAIAA PAPER 92-2897] Comparison between two 3D-NS-codes and experiment on a turbine stator

[AIAA PAPER 92-3042] p 822 A92-48703 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression scramjet inlets

| AIAA PAPER 92-30991 p 824 A92-48741 The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine combustor swirl cup

[AIAA PAPER 92-3231] p 863 A92-48832 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer | AIAA PAPER 92-3249 | p 894 A92-48848

Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. II - Three-dimensional flow field at the exit of the nozzle

| AIAA PAPER 92-3326 | p 826 A92-48909

Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions

p 907 A92-49087 [AIAA PAPER 92-3666] Full Navier-Stokes analysis of a two-dimensional mixer/ejector nozzle for noise suppression

p 868 N92-28419 INASA-TM-1057151 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction

[NASA-TP-3197] p 827 N92-28477 Comparison of LDA and LTA applications for propeller tests in wind tunnels

INLR-MP-88031-UI p 827 N92-28658 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind

[NASA-TM-105417] p 887 N92-28673 Flow gradient corrections on hot-wire measurements using an X-wire probe

INLR-TP-90255-U1 p 829 N92-28713

Natural flow wing INASA-CASE-LAR-14281-1] p 829 N92-28729 Flow visualization studies of a sideslipping,

canard-configured X-31A-Like fighter aircraft model [AD-A245940] p 829 N92-28883 Computation of three-dimensional effects on two

dimensional wings [NASA-CR-190576] p 832 N92-29691

Explicit Navier-Stokes computation of turbomachinery

p 911 N92-29933 [AD-A248458] Experimental investigation of the flowfield of an oscillating airfoil

p 833 N92-30182 [NASA-TM-105675]

FLOW EQUATIONS

Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction p 827 N92-28477

Explicit Navier-Stokes computation of turbomachinery

[AD-A249284] p 909 N92-28879

FLOW GEOMETRY

Experimental investigation of vortex dynamics on delta

[AIAA PAPER 92-2731] p 804 A92-45565 Taylor series approximation of geometric shape variation p 899 A92-46916 for the Euler equations

Basic experiments on the directivity of the sound radiation emitted by a turboshaft engine

p 926 A92-48597 IONERA, TP NO. 1992-361

FLOW MEASUREMENT

On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in p 880 A92-45265

Surface and flow field measurements in a symmetric crossing shock wave/turbulent boundary layer flow [AIAA PAPER 92-2634] p 806 A92-45574

Measurements of the unsteady vortex flow over a wing-body at angle of attack p 808 A92-45598

[AIAA PAPER 92-2729] Measurement of shock-wave/boundary-layer interaction in a free-piston shock tunnel p 813 A92-46903 Measurement of scalar flowfield at exit of combustor sector using Raman diagnostics

[AIAA PAPER 92-3350] p 894 A92-48927 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel

p 887 N92-28673 [NASA-TM-105417] Flow gradient corrections on hot-wire measurements using an X-wire probe

p 829 N92-28713 [NLR-TP-90255-U] Evaluation of measured-boundary-condition methods for 3D subsonic wall interference

p 832 N92-29884 [NLR-TR-88072-U] FLOW STABILITY

Concepts for the stability analysis of NLF-experiments

on swept wings IAIAA PAPER 92-27061 p 801 A92-45548 Methods for direct simulation of transition in hypersonic p 912 N92-30064 boundary layers 2
FLOW VELOCITY

Quantification of canard and wing interactions using spatial correlation velocimetry p 807 A92-45588

[AIAA PAPER 92-2687] Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 The application of particle image velocimetry (PIV) in a

short-duration transonic annular turbine cascad IASME PAPER 91-GT-2211 p 899 A92-46825 Laser velocimetry measurements in an MHD aerodynamic duct

| AIAA PAPER 92-2986 | n 899 A92-46996 Effect of the grid system on heat transfer computations for high speed flows p 900 A92-47071

Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic

| AIAA PAPER 92-3246 | p 904 A92-48845

Flow gradient corrections on hot-wire measurements using an X-wire probe p 829 N92-28713

INLR-TP-90255-UJ FLOW VISUALIZATION

Simultaneous imaging and interferometric turbule visualization in a high-velocity mixing/shear layer

p 896 A92-45130 p 880 A92-45266 Water tunnels Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept

p 860 A92-45316 Experimental investigation of the flowfield of an oscillating airfoil

[AIAA PAPER 92-2622] p 793 A92-45494 Dynamically enhanced sustained lift using oscillating leading-edge flaps

[AIAA PAPER 92-2625] p 794 A92-45497 Static and dynamic flow field development about a porous suction surface wing

[AIAA PAPER 92-2628] p 795 A92-45500 Experimental development of spanwise vortex models

with streamwise decay due to wall interaction I AIAA PAPER 92-26881 p 799 A92-45535 The flip flop nozzle extended to supersonic flows

p 803 A92-45561 | AIAA PAPER 92-2724 | Visualization of stopping flow over airfoils

[AIAA PAPER 92-2730] p 804 A92-45564 Exploratory investigation of a spanwise blowing concept for tip-stall control on cranked-arrow wings

p 806 A92-45576 [AIAA PAPER 92-2637] Quantification of canard and wing interactions using spatial correlation velocimetry

[AIAA PAPER 92-2687] p 807 A92-45588 Streamlines, vorticity lines, and vortices around three-dimensional bodies p 808 A92-45845 p 808 A92-45845 Experimental study of vortex flows over delta wings in wing-rock motion p 810 A92-46787

Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model

p 874 A92-46810 Joint computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental results p 812 A92-46890

Flow visualisation of a small diameter rotor operating at high rotational speeds with blades at small pitch anales p 814 A92-46949

New concepts for multi-block grid generation for flow domains around complex aerodynamic configurations

p 817 A92-47079 Flow visualization studies of a sideslipping, canard-configured X-31A-Like fighter aircraft model (AD-A2459401 p 829 N92-28883

FLUID JETS

Supersonic jet mixing enhancement by 'delta-tabs' AIAA PAPER 92-3548 | p 826 A92-49063

FLUID-SOLID INTERACTIONS

Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885 FLUTTER

A numerical study of control surface buzz using computational fluid dynamic methods [AIAA PAPER 92-2654] p 806 A92-45578

Buffet test in the National Transonic Facility NASA-CR-189595] p 888 N92-29352 FLUTTER ANALYSIS

Response characteristics of a wing in supersonic flow ear flutter boundary ISAE PAPER 9119991 p 789 A92-45401

Preliminary study of algorithm for real-time flutter

[SAE PAPER 912001] SAE PAPER 912001] p 897 A92-45403 Whirl-flutter stability of a pusher configuration in onuniform flow p 845 A92-46813

FLUX VECTOR SPLITTING

A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations

[AIAA PAPER 92-2643] p 796 A92-45510 LU-SGS implicit scheme for entry vehicle flow computation and comparison with aerodynamic data I AIAA PAPER 92-26711 p 798 A92-45526

Comparison of two flux splitting schemes for calculation of ogive-cylinder at M = 3.5 and alpha = 18 deg

[AIAA PAPER 92-2667] p 806 A92-45582 Effect of the grid system on heat transfer computations for high speed flows
FLY BY WIRE CONTROL p 900 A92-47071

Simple fly-by-wire actuator p 876 A92-48491 C-141 and C-130 power-by-wire flight control systems p 876 A92-48493 Electric actuation system duty cycles ---

p 877 A92-48494 fly-by-wire/power-by-wire control Making fly-by-light a reality p 877 A92-48499

SUBJECT INDEX		
Results of a flight simulator e	vneriment	to establish
handling quality guidelines for the d		
aircraft	-sign or res	
NLR-MP-88044-U	p 854	N92-29616
FLYING PERSONNEL		0
Full model simulation of the Na - Research and training platform		A92-45042
FLYWHEELS	p 000	A32-43042
Active magnetic bearings give s	ystems a li	ft
	p 901	A92-48201
FOREBODIES		
The effects of nozzle exit geome	etry on fore	body vortex
control using blowing [AIAA PAPER 92-2603]	p 792	A92-45480
Analysis of a pneumatic foreboo	•	
about a full aircraft geometry	•	
[AIAA PAPER 92-2678]	p 799	A92-45530
Alleviation of side force on tar	igent-ogive	torebodies
using passive porosity [AIAA PAPER 92-2711]	p 802	A92-45552
Forebody vortex control for sup		
a highly-swept wing configuration		
[AIAA PAPER 92-2716]		A92-45555
Computation of turbulent flor	w about c	one-derived
waverider [AIAA PAPER 92-2726]	р 804	A92-45562
Dynamic LEX/forebody vortex in		
[AIAA PAPER 92-2732]	p 804	A92-45566
Forebody flow control on a fu	ll-scale F/	A-18 aircraft
[AIAA PAPER 92-2674]		A92-45583
Full-scale high angle-of-attack to		
[AIAA PAPER 92-2676]	•	A92-45584
Forebody vortex control using si	пан, готата р 811	A92-46798
Effect of a nose-boom on forebo	•	
		A92-46818
	p 0 12	1102 40010
FORECASTING	p 612	7102 40010
FAA aviation forecasts	,	
FAA aviation forecasts [AD-A250412]	·	N92-29182
FAA aviation forecasts [AD-A250412] FORMAT	p 837	
FAA aviation forecasts [AD-A250412]	p 837 ormat	
FAA aviation forecasts [AD-A250412] FORMAT	p 837 ormat	N92-29182
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp-v	p 837 ormat p 900 version fini	N92-29182 A92-47528 te elements
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp- in time	p 837 ormat p 900 version fini p 874	N92-29182 A92-47528 te elements A92-46931
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp-vin time Identification of aerodynamic m	p 837 ormat p 900 version fini p 874	N92-29182 A92-47528 te elements A92-46931
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp- in time	p 837 ormat p 900 version fini p 874	N92-29182 A92-47528 te elements A92-46931
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp-r in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS	p 837 ormat p 900 version fini p 874 odels for n p 852	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp-v in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques;
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hprointime Identification of aerodynamic maircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime purion of the Symposium, S	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques;
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp-v in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques;
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hpointime Identification of aerodynamic maircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi Proceedings of the Symposium, S. 24, 1990 [ASTM STP-1122] Probability analysis of structure fi	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francis p 896 ailure for th	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 format p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 alilure for th p 848	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 ormat p 900 version fini p 874 odels for n p 852 edictive t an Francisc p 896 ailure for th is p 848 khead subjekt	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cted to load
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the s	p 837 ormat p 900 version fini p 874 odels for n p 852 edictive t an Francisc p 896 ailure for th is p 848 khead subjekt	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Franciso p 896 ailure for th p 848 thead subje p 848	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cted to load
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp- in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi Proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure fi main and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 ailure for th: p 848 head subje p 848 p 854 t NASA re	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cited to load A92-47664 N92-29511 lated to the
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the solutions with hose in time aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pure proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure firmain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisi p 848 ailure for th p 848 bhead subje p 848 p 854 t NASA re p 913	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cted to load A92-47664 N92-29511 atted to the N92-30110
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 ormat p 900 version fini p 874 odels for n p 852 edictive t an Francisc p 896 ailure for th is p 848 p 854 t NASA re p 913 re analysis	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cted to load A92-47664 N92-29511 lated to the N92-30110
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the solutions with hose in time aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pure proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure firmain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 ailure for th: p 848 head subjei p 848 p 854 t NASA re p 913 re analysis ns	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cted to load A92-47664 N92-29511 lated to the N92-30110
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 ormat p 900 version fini p 874 odels for n p 852 edictive t an Francisc p 896 ailure for th is p 848 p 854 t NASA re p 913 re analysis ns p 913	A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47664 A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp- in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi Proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure fi main and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet Preliminary results on the fractur cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fractur	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisi p 848 hiead subjet p 848 p 854 t NASA re p 913 re analysis	A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47664 A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the second of the	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisi p 896 ailure for th p 848 she ad subje p 848 t NASA re p 913 re analysis s p 913 re analysis	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 che vings with A92-47657 abg-47657 lated to the N92-39511 lated to the N92-30110 of multi-site
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hp- in time Identification of aerodynamic m aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi Proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure fi main and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet Preliminary results on the fractur cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fractur	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisi p 848 hiead subjet p 848 p 854 t NASA re p 913 re analysis	A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47664 A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hpvin time Identification of aerodynamic maircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pin proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure finain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet preliminary results on the fractur cracking of lap joints in aircraft ski	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 ailure for th p 848 shead subje p 848 t NASA re p 913 re analysis n p 913 re analysis ns p 913	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47657 cited to load A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111 telemetry
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the solutions with hose in time aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pure proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure finain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet Preliminary results on the fracture cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fracture cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fracture cracking of lap joints in aircraft ski FRAMES (DATA PROCESSING) Modern techniques for monitorin	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 ailure for th p 848 head subjet p 848 p 854 t NASA re p 913 re analysis ns p 913	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47667 cited to load A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111 of multi-site
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording f FOURIER ANALYSIS Periodic trim solutions with hpvin time Identification of aerodynamic maircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pi Proceedings of the Symposium, S. 24, 1990 [ASTM STP-1122] Probability analysis of structure fimain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet Preliminary results on the fractuc cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fractuc cracking of lap joints in aircraft ski FRACTURING FRAMES (DATA PROCESSING) Modern techniques for monitorin	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisc p 896 ailure for th p 848 head subje head subje p 848 p 854 t NASA re p 913 re analysis ns p 913 re analysis	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47667 roted to load A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111 telemetry A92-47560
FAA aviation forecasts [AD-A250412] FORMAT 24-bit flight test data recording for the solutions with hose in time aircraft [NASA-CR-190444] FRACTURE MECHANICS Advances in fatigue lifetime pure proceedings of the Symposium, S 24, 1990 [ASTM STP-1122] Probability analysis of structure finain and subordinate components Durability analysis for a main bulk on the body of an aircraft Tear straps in airplane fuselage [AD-A248543] Fracture mechanics research a aging commercial transport fleet Preliminary results on the fracture cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fracture cracking of lap joints in aircraft ski FRACTURING Preliminary results on the fracture cracking of lap joints in aircraft ski FRAMES (DATA PROCESSING) Modern techniques for monitorin	p 837 ormat p 900 version fini p 874 odels for n p 852 redictive t an Francisi p 848 head subje p 848 p 854 t NASA re p 913 re analysis ns p 913 re analysis ns p 913 re analysis head subje head su	N92-29182 A92-47528 te elements A92-46931 naneuvering N92-28720 echniques; co, CA, Apr. A92-45226 e wings with A92-47667 roted to load A92-47664 N92-29511 lated to the N92-30110 of multi-site N92-30111 telemetry A92-47560

Results of a flight simulator experiment to establish handling quality guidelines for the design of future transport	FUE
aircraft NLR-MP-88044-U p 854 N92-29616	ai
FLYING PERSONNEL	po
Full model simulation of the National Airspace System - Research and training platform p 880 A92-45042	17
FLYWHEELS	14
Active magnetic bearings give systems a lift	
p 901 A92-48201 FOREBODIES	FUE
The effects of nozzle exit geometry on forebody vortex	E,
control using blowing [AIAA PAPER 92-2603] p 792 A92-45480	FUE
Analysis of a pneumatic forebody flow control concept	
about a full aircraft geometry	of (A
Alleviation of side force on tangent-ogive forebodies	FUE
using passive porosity	ac
AIAA PAPER 92-2711 p 802 A92-45552	{ A
Forebody vortex control for suppressing wing rock on a highly-swept wing configuration	hi
[AIAA PAPER 92-2716] p 803 A92-45555	Į A
Computation of turbulent flow about cone-derived waverider	FUE
[AIAA PAPER 92-2726] p 804 A92-45562	di
Dynamic LEX/forebody vortex interaction effects	co [A
[AIAA PAPER 92-2732] p 804 A92-45566 Forebody flow control on a full-scale F/A-18 aircraft	, ,
[AIAA PAPER 92-2674] p 806 A92-45583	CC
Full-scale high angle-of-attack tests of an F/A-18 [AlAA PAPER 92-2676] p 806 A92-45584	[A
[AlAA PAPER 92-2676] p 806 A92-45584 Forebody vortex control using small, rotatable strakes	
p 811 A92-46798	ai FUE
Effect of a nose-boom on forebody vortex flow p 812 A92-46818	
FORECASTING	m
FAA aviation forecasts	FUL
[AD-A250412] p 837 N92-29182 FORMAT	
24-bit flight test data recording format	ej
p 900 A92-47528 FOURIER ANALYSIS	by
Periodic trim solutions with hp-version finite elements	fa (S
in time p 874 A92-46931	
Identification of aerodynamic models for maneuvering aircraft	[A
[NASA-CR-190444] p 852 N92-28720	(A
FRACTURE MECHANICS Advances in fatigue lifetime predictive techniques;	
Proceedings of the Symposium, San Francisco, CA, Apr.	{ A
24, 1990 [ASTM STP-1122] p 896 A92-45226	Ce
Probability analysis of structure failure for the wings with	in
main and subordinate components p 848 A92-47657 Durability analysis for a main bulkhead subjected to load	FUN
on the body of an aircraft p 848 A92-47664	air
Tear straps in airplane fuselage [AD-A248543] p 854 N92-29511	[N FUN
Fracture mechanics research at NASA related to the	
aging commercial transport fleet p 913 N92-30110 Preliminary results on the fracture analysis of multi-site	fo (N
cracking of lap joints in aircraft skins	(,,
p 913 N92-30111 FRACTURING	De
Preliminary results on the fracture analysis of multi-site	[A
cracking of lap joints in aircraft skins p 913 N92-30111	pr
FRAMES (DATA PROCESSING)	۱۸ FUS
Modern techniques for monitoring airborne telemetry p 857 A92-47560	rus
FREE FLIGHT	at
Hang-glider response to atmospheric inputs p 874 A92-46765	fil
P 874 A92-46765 FREE VIBRATION	
Free vibration analysis of branched blades by the	in
integrating matrix method p 847 A92-47122 FREEZING	104
	lif
On the possibility of freezing and sticking phenomena	
On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard	st
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426	
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE	st
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885	st po ar
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885 Frequency domain flight testing and analysis of an	st po ar (A
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885 Frequency domain flight testing and analysis of an OH-58D helicopter p 847 A92-46943 FROST	st po ar
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885 Frequency domain flight testing and analysis of an OH-58D helicopter p 847 A92-46943 FROST Aerodynamic characteristics of hoar frost roughness	st po ar (A
in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 FREQUENCY RESPONSE Ritz vectors synthesis versus modal synthesis for fluid-structure interaction modeling p 898 A92-45885 Frequency domain flight testing and analysis of an OH-58D helicopter p 847 A92-46943 FROST	st po ar (/

FUEL COMBUSTION

Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities

[AIAA PAPER 92-3429] p 894 A92-48986

	GAS TURBINE ENGINES
FUEL CONCUMENTON	G
FUEL CONSUMPTION Optimum cruise lift coefficient in initial design of jet	ď
aircraft p 845 A92-46806 High speed rotorcraft propulsion concepts to control power/speed characteristics	GALERKIN METHOD Mesh adaption for 2D transsonic Euler flows on unstructured meshes p 816 A92-47038
AIAA PAPER 92-3367 p 865 A92-48940 Turboshaft/turboprop cycle sensitivity analysis	GAS DYNAMICS Smooth solutions for transonic gasdynamic equations
AIAA PAPER 92-3476 p 865 A92-49020 Practical considerations in designing the engine cycle p 869 N92-28460	Russian book [ISBN 5-02-029345-8] p 809 A92-46626
FUEL CONTAMINATION Microbiological spoilage of aviation turbine fuel. II	Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems
Evaluation of a suitable biocide p 891 A92-45600 FUEL CONTROL	[AIAA PAPER 92-3246] p 904 A92-48845
The numerical simulation of the main fuel control unit of gas turbine engines	GAS FLOW High Reynolds number flows using liquid and gaseous helium
[AIĀA PAPĒR 92-3760] p 867 A92-49115 FUEL INJECTION	[ISBN 0-387-97475-X] p 897 A92-45261
Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection	Multidimensional Euler/Navier-Stokes analysis for hypersonic equilibrium gas
[AIAA PAPER 92-3251] p 890 A92-48849 A comparative study of scramjet injection strategies for	[SAE PAPER 912026] p 790 A92-45418 Numerical simulations of hypersonic real-gas flows over
high Mach numbers flows [AIAA PAPER 92-3287] p 904 A92-48876 FUEL SPRAYS	space vehicles [SAE PAPER 912045] p 791 A92-45429
The influence of spray angle on the continuous- and	Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows
discrete-phase flowfield downstream of an engine combustor swirl cup	[AIAA PAPER 92-2852] p 892 A92-47835 GAS INJECTION
[AIAA PAPER 92-3231] p 863 A92-48832 A numerical study of two-phase flow in gas turbine	LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection
combustors [AIAA PAPER 92-3468] p 905 A92-49015	[AIAA PAPER 92-2692] p 800 A92-45539 GAS LUBRICANTS
FUEL TANKS Use of adhesive bonded attachments for a composite	Development of high performance compressor discharge seal
aircraft fuel tank p 785 A92-47414 FUEL-AIR RATIO	[AIAA PAPER 92-3714] p 907 A92-49096 GAS MIXTURES
Calculation methods on equivalence ratio of multi-propellant for propulsion system p 893 A92-48269	Calculation methods on equivalence ratio of multi-propellant for propulsion system p 893 A92-48269
FULL SCALE TESTS	GAS PRESSURE
Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313	Second-order shock-expansion theory extended to include real gas effects
The large scale test control systems designed and built by the Boeing Company to support the 757 and 767 major	[AD-A247191] p 831 N92-29539 GAS TURBINE ENGINES
fatigue tests [SAE PAPER 911985] p 881 A92-45388	Auxiliary power units for current and future aircraft [SAE PAPER 912059] p 862 A92-45441
Dynamic LEX/forebody vortex interaction effects [AIAA PAPER 92-2732] p 804 A92-45566	The use of optical sensors and signal processing gas turbine engines p 856 A92-46247
Forebody flow control on a full-scale F/A-18 aircraft [AIAA PAPER 92-2674] p 806 A92-45583	Gas turbine exhaust system silencing design p 882 A92-47365
Full-scale high angle-of-attack tests of an F/A-18 [AIAA PAPER 92-2676] p 806 A92-45584	Basic analysis of counter-rotating turbines p 862 A92-47692
Aging aircraft NDI Development and Demonstration Center (AANC): An overview nondestructive	Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791
inspection p 915 N92-30120	The impact of advanced materials on small turbine engines
FUNCTIONAL ANALYSIS Identification of aerodynamic models for maneuvering	[SAE PAPER 911207] p 862 A92-48021 Fiber-optic pressure sensor system for gas turbine
aircraft [NASA-CR-190444] p 852 N92-28720	engine control p 857 A92-48047 Active magnetic bearings give systems a lift
FUNCTIONAL DESIGN SPECIFICATIONS Some longitudinal handling qualities design guidelines	p 901 A92-48201 The flow pattern and external heat transfer investigation
for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652	for gas turbine vanes end surfaces [AIAA PAPER 92-3071] p 903 A92-48722
Design specifications for the Advanced Instructional Design Advisor (AIDA), volume 2	Mixing in the dome region of a staged gas turbine combustor
[AD-A248202] p 923 N92-29188 Application of VME-technology on an airborne data link	[AIAA PAPER 92-3089] p 903 A92-48734 Experimental study of cross-stream mixing in a
processor unit [NLR-MP-88040-U] p 841 N92-29615	rectangular duct {AIAA PAPER 92-3090} p 903 A92-48735
FUSELAGES Navier-Stokes predictions for the F-18 wing and fuselage	Design and test of an Active Tip Clearance System for centrifugal compressors
at large incidence p 810 A92-46783	[AIAA PAPER 92-3189] p 863 A92-48801 Simple effective thickness model for circular brush
The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934	seals [AIAA PAPER 92-3192] p 903 A92-48803
A study of rotor wake development and wake/body interactions in hover p 813 A92-46935	Aero mechanics in the twenty-first century [AIAA PAPER 92-3194] p 863 A92-48805
Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054	The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine
Filament winding of composite isogrid fuselage structures p 784 A92-47405	combustor swirl cup [AIAA PAPER 92-3231] p 863 A92-48832
Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406	Numerical simulation of turbine 'hot spot' alleviation using film cooling
Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs	[AIAA PAPER 92-3309] p 904 A92-48896 Expert systems for the trouble-shooting and the
[AD-A250390] p 854 N92-29180	diagnostics of engines [AIAA PAPER 92-3327] p 923 A92-48910
Tear straps in airplane fuselage [AD-A248543] p 854 N92-29511	An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941
Performance of fuselage pressure structure p 913 N92-30109	A distributed vaporization time-lag model for gas turbine combustor dynamics
Damaged stiffened shell research at NASA. Langley Research Center p 914 N92-30115	[AIAA PAPER 92-3465] p 865 A92-49014 A numerical study of two-phase flow in gas turbine
Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123	combustors [AIAA PAPER 92-3468] p 905 A92-49015
F	

GAS TURBINES SUBJECT INDEX

Prediction of gas turbine combustor flow by a finite Computed Tomography (CT) as a nondestructive test Generation of unstructured grids within a hybrid method used for composite helicopter components [MBB-UD-0603-91-PUB] p 910 N92-2 p 818 A92-47090 multi-block environment [AIAA PAPER 92-3469] p 910 N92-29873 Orthogonal grids for multiple airfoils p 906 A92-49016 p 818 A92-47096 Experimental pyrometer system for a gas turbine GI AZES LDV measurements on a rectangular wing with a Prediction of a high bypass ratio engine exhaust nozzle [AIAA PAPER 92-3482] p 859 A92-49022 simulated glaze ice accretion [AIAA PAPER 92-3259] p 800 A92-45537 p 864 A92-48855 Manufacturing technology methodology for propulsion [AIAA PAPER 92-2690] Investigation of three-dimensional flow field in a turbine Results of a low power ice protection system test and [AIAA PAPER 92-3525] p 906 A92-49048 including rotor/stator interaction. I - Design development a new method of imaging data analysis and performance of the research facility Flexible manufacturing in repair of gas turbine engine p 828 N92-28696 INASA-TM-1057451 [AIAA PAPER 92-3325] p 883 A92-48908 **GLOBAL POSITIONING SYSTEM** Hyperbolic grid generation with BEM source terms [NLR-TP-90334-U] p 923 N92-28 p 786 A92-49049 [AIAA PAPER 92-3524] Global Positioning System telecommand link p 923 N92-28635 Development of high performance compressor p 839 A92-47566 Development of a multigrid transonic potential flow code discharge seal Computer-Controlled Navigation System/General [AIAA PAPER 92-3714] p 907 A92-49096 for cascades Positioning System (CCNS/GPS) - A guidance, positioning, [NASA-CR-190480] p 830 N92-29361 Emerging technologies for gas turbine engines - U.A.V. and management system for remote sensing flights Hyperbolic grid generation control by panel methods synergies p 840 A92-47630 p 867 A92-49114 p 924 N92-29604 [AIAA PAPER 92-3757] INLR-TP-91061-U1 Construction of a real-time DGPS experimental system NASA Workshop on future directions in surface modeling The numerical simulation of the main fuel control unit p 840 A92-47631 and grid generation of gas turbine engines GOERTLER INSTABILITY INASA-CP-100921 [AIAA PAPER 92-3760] p 867 A92-49115 p 831 N92-29625 The inviscid compressible Goertler problem in GRINDING Engine aircraft systems integration course [AIAA PAPER 92-3762] p 928 A92-49117 three-dimensional boundary layers p 809 A92-46441 Study of grinding process and strength for ceramic heat insulated engine [SME PAPER MR91-177] Lubricant evaluation and performance 2 GRAPHITE-EPOXY COMPOSITES p 897 A92-45260 Buckling, postbuckling and crippling of thin walled p 895 N92-28398 [AD-A247464] GROUND EFFECT (AERODYNAMICS) Steady and Transient Performance Prediction of Gas composite airframe structures under compression Turbine Engines p 899 A92-46940 A USAF assessment of STOVL fighter options [AGARD-LŠ-1831 p 868 N92-28458 p 842 A92-45310 **GRID GENERATION (MATHEMATICS)** Practical considerations in designing the engine cycle Recent developments at the Shoeburyness STOVL test Three-dimensional orthogonal-to-surface structured grid generation with transonic Navier-Stokes flow solutions for p 869 N92-28460 p 881 A92-45314 Steady and transient performance calculation method commercial transport configuration Hot-gas reingestion - Engine response considerations p 860 A92-45317 for prediction, analysis, and identification p 793 A92-45490 I AIAA PAPER 92-26161 p 869 N92-28461 An adaptive grid method for computing the high speed The experimental and computational study of jet Component performance requirements 3D viscous flow about a re-entry vehicle impingement flowfields with reference to VSTOL aircraft p 869 N92-28462 p 799 A92-45534 performance p 787 A92-45324 1 AIAA PAPER 92-26851 Dynamic simulation of compressor and gas turbine erformance p 869 N92-28463 Viscous effects on a vortex wake in ground effect [NASA-CR-190400] p 907 N92-2i Computational evaluation of an airfoil with a Gurney performance p 907 N92-28361 Calculation of installation effects within performance [AIAA PAPER 92-2708] p 802 A92-45550 **GROUND HANDLING** p 869 N92-28465 Surface grid generation in a parameter space Enhancement of ground handling through optimum computer programs selection/use of Ground Support Equipment (GSE)
[SAE PAPER 911973] p 881 A92-45380 Dynamic control of aerodynamic instabilities in gas [AIAA PAPER 92-2717] p 803 A92-45556 A new automatic grid generation environment for CFD p 870 N92-28466 turbine engines Engine performance and health monitoring models using GROUND STATIONS applications p 803 A92-45558 p 882 A92-47562 steady state and transient prediction methods [AIAA PAPER 92-2720] Remote telemetry concepts p 870 N92-28467 Prismatic grid generation with an efficient algebraic method for aircraft configurations Gulf Range Drone Control Upgrade System Mobile p 882 A92-47567 Turbine aircraft engine operational trending and JT8D Control System GROUND SUPPORT EQUIPMENT [AIAA PAPER 92-2721] p 803 A92-45559 Temporal adaptive Euler/Navier-Stokes algorithm static component reliability study [DOT/FAA/CT-91/10] n 870 N92-28686 Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-4 Applied analytical combustion/emissions research at the involving unstructured dynamic meshes NASA Lewis Research Center p 812 A92-46887 p 881 A92-45380 [NASA-TM-105731] p 890 N92-29343 **GROUND TESTS** Compact higher order characteristic-based Euler solver Fatigue in single crystal nickel superalloys [AD-A248190] p 896 Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 87 for unstructured grids p 812 A92-46889 p 877 A92-48608 p 896 N92-29408 Numerical grid generation in computational fluid Flight evaluation of an extended engine life mode on Experimental aerodynamic facilities of the Aerodynamics dynamics and related fields; Proceedings of the 3rd an F-15 airplane [NASA-TM-104240] Research and Concepts Assistance Branch International Conference, Universidad Politecnica de IAD-A2474891 p 871 N92-29659 p 883 N92-28248 Cataluna, Barcelona, Spain, June 3-7, 1991 GROUND-AIR-GROUND COMMUNICATION GAS TURBINES LISBN 0-444-88948-51 p 918 A92-47035 Overview on basis and use of performance prediction Unstructured and adaptive mesh generation for high Data Link integration in commercial transport p 839 A92-44919 methods p 869 N92-28459 Reynolds number viscous flows p 816 A92-47042 operations GAS VISCOSITY Feasibility study on a microwave-powered unmanned Anisotropic control of mesh generation based upon a Gas turbine exhaust system silencing design p 882 A92-47365 Voronoi type method p 918 A92-47043 aerial vehicle for the communication relay utilization [SAE PAPER 912052] Grid adaptation to multiple functions for applied p 843 A92-45436 GROUP DYNAMICS p 817 A92-47045 aerodynamic analysis Advanced Rotorcraft Transmission program summary AIAA PAPER 92-3363 p 905 A92-48936 Adaptive parallel meshes with complex geometry Tasking and communication flows in the F/A-18D [AIAA PAPER 92-3363] cockpit: Issues, problems, and possible solutions p 918 A92-47050 AD-A245977] p 853 N92-28802 An eight month gearbox development program Gridding strategies and associated results for winged AIAA PAPER 92-3368] p 850 A92-48941 Design criteria and analysis of the dynamic behavior [AIAA PAPER 92-3368] p 918 A92-47051 **GUST LOADS** System for generating sequences of phased gust or taxi An unstructured mesh generation algorithm for p 845 A92-46800 of high speed, heavily loaded and precision epicyclic gears three-dimensional aeronautical configurations p 918 A92-47053 Response of helicopters to gusts [NLR-TP-90159-U] for aircraft use [AIAA PAPER 92-3491] p 879 N92-28653 p 906 A92-49028 Single block mesh generation for a fuselage plus two Analytical evaluation of resonant response of spiral bevel Short cracks and durability analysis of the Fokker 100 lifting surfaces p 817 A92-47054 gears in the RAH-66 helicopter Fantail transmission Grid generation and compressible flow computations wing/fuselage structure [NLR-TP-90336-U] [AIAA PAPER 92-3495] p 906 A92-49031 p 910 N92-29603 about a high-speed civil transport configuration p 919 A92-47055 **GUSTS** Application of face-gear drives in helicopter grid Airfoil wake and linear theory gust response including Multi-block generation sub and superresonant flow conditions INASA-TM-1056551 p 908 N92-28434 wing-body-engine-pylon configurations p 823 A92-48724 [AIAA PAPER 92-3074] p 817 A92-47060 Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-2 Upgrading the data processing section of the NAL Gust Wind Tunnel data processing system p 910 N92-29136 3-D numerical grid generation for the transonic flow analysis about multi-bodies p 817 A92-47061 GENERAL AVIATION AIRCRAFT [NAL-TM-635] p 888 N92-28833 Interactive algebraic mesh generation for twin jet Studies in general aviation aerodynamics GYROSCOPIC STABILITY transport aircraft p 817 A92-47064 p 827 N92-28511 INASA-CR-1904311 Interactive generation of structured/unstructured Wideband control of gyro/accelerometer multisensors FAA aviation forecasts in a strapdown guidance system p 856 A92-46736 surface meshes using adaptivity p 919 A92-47066 p 837 N92-29182 IAD-A2504121 Simple diagnosis for the quality of generated grid **GEOIDS** systems Selected models of aircraft navigation space Patch-independent structured multiblock grids for CFD p 839 A92-45373 omputations p 919 A92-47078
New concepts for multi-block grid generation for flow **GERMANY** HANG GLIDERS German-GUS cooperation in civil aviation domains around complex aerodynamic configurations Hang-glider response to atmospheric inputs p 785 A92-47592 p 874 A92-46765 p 817 A92-47079 Generation of efficient multiblock grids for Navier-Stokes DLR research reports and communications Wing design for hanggliders having minimum induced p 929 N92-29218 p 811 A92-46814 IFTN-92-913911 p 919 A92-47081 A geometry-integrated approach to multiblock grid GLASS FIBER REINFORCED PLASTICS HARMONIC CONTROL Fabrication and mechanical properties of an optically p 919 A92-47083 Comparison of three controllers applied to helicopter

The construction, application and interpretation of

three-dimensional hybrid meshes

p 919 A92-47089

[NASA-TM-102192]

p 878 N92-28457

transparent glass fiber/polymer matrix composite

p 891 A92-45630

HARRIER AIRCRAFT	HELICOPTER DESIGN	Experimental and computational studies of hovering
Harrier international programme p 841 A92-45305 VSTOL engine design evolution - Growth of the Pegasus	The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives	rotor flows p 815 A92-46954 Initial validation of an unsteady Euler/Navier-Stokes flow
engine for Harrier p 860 A92-45306	[SAE PAPER 911984] p 843 A92-45387	solver for helicopter rotor airloads in forward flight
ASTOVL engine control p 860 A92-45321	Sensitivity analysis of discrete periodic systems with applications to helicopter rotor dynamics	p 815 A92-46956
Harrier GR MK 5/7 mission simulators for the Royal	p 846 A92-46884	A new integral equation for potential compressible aerodynamics of rotors in forward flight
Air Force p 885 N92-28540 HEAD-UP DISPLAYS	An aeroelastic analysis with a generalized dynamic	p 815 A92-46958
The standardization of military head-up display	wake p 847 A92-46932 Design of helicopter composite structures for	Aerodynamic parametric studies and sensitivity analysis
symbology p 855 A92-44929	crashworthiness p 848 A92-47408	for rotor blades in axial flight p 816 A92-46959
HEAT FLUX	Research and studies on quiet helicopters	HELICOPTERS Aviation, motor, and space designs research and
Effect of the grid system on heat transfer computations for high speed flows p 900 A92-47071	[ONERA, TP NO. 1992-59] p 926 A92-48618 Advanced Rotorcraft Transmission program summary	development in U.S.S.R. p 784 A92-46202
HEAT OF COMBUSTION	[AIAA PAPER 92-3363] p 905 A92-48936	Experimental investigation of the parallel vortex-airfoil
Ignition delays, heats of combustion, and reaction rates	Boeing Helicopters Advanced Rotorcraft Transmission	interaction at transonic speeds p 813 A92-46901 A field repair of advanced helicopter vertical fin
of aluminum atkyl derivatives used as ignition and combustion enhancers for supersonic combustors	(ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937	structure p 785 A92-47417
[AIAA PAPER 92-3841] p 894 A92-49134	Analytical evaluation of resonant response of spiral bevel	An analysis of aircrew communication patterns and
HEAT PIPES	gears in the RAH-66 helicopter Fantail transmission	content
Analytical and experimental studies of heat pipe radiation cooling of hypersonic propulsion systems	[AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter	(AD-A246618) p 907 N92-28253 Passive acoustic range estimation of helicopters
[AIAA PAPER 92-3809] p 867 A92-49128	transmissions	[AD-A248033] p 926 N92-28302
HEAT RESISTANT ALLOYS	[NASA-TM-105655] p 908 N92-28434 The application of flight simulation models in support	A sensitivity analysis on component reliability from
Elevated temperature crack growth in aircraft engine materials p 891 A92-45234	of rotorcraft design and development	fatigue life computations [AD-A247430] p 908 N92-28425
Advanced superalloys for turbine blade and vane	p 884 N92-28527	Comparison of three controllers applied to helicopter
applications	Repair procedures for advanced composites for helicopters	vibration [NASA-TM-102192] p 878 N92-28457
[ONERA, TP NO. 1992-2] p 893 A92-48578	[MBB-UD-0606-91-PUB] p 787 N92-29874	[NASA-TM-102192] p 878 N92-28457 Aircraft ship operations
Aluminides modified by palladium - Protection of new parts by local finishing	HELICOPTER ENGINES	[AGARD-AR-312] p 850 N92-28468
[ONERA, TP NO. 1992-49] p 893 A92-48610	Basic experiments on the directivity of the sound radiation emitted by a turboshaft engine	Experience with piloted simulation in the development of helicopters p 884 N92-28528
Manufacturing technology methodology for propulsion	[ONERA, TP NO. 1992-36] p 926 A92-48597	Full mission simulation: A view into the future
system parts (AIAA PAPER 92-3525) p 906 A92-49048	Acoustic spinning-mode analysis by iterative threshold	p 884 N92-28537
Fatigue in single crystal nickel superalloys	method applied to a helicopter turboshaft engine [ONERA, TP NO. 1992-41] p 926 A92-48602	An evaluation of IFR approach techniques: Generic helicopter simulation compared with actual flight
[AD-A248190] p 896 N92-29408	Advanced Rotorcraft Transmission (ART) - Component	p 886 N92-28550
HEAT SINKS The optimization of variable cross-section spines with	test results [AIAA PAPER 92-3366] p 905 A92-48939	Response of helicopters to gusts
temperature dependent thermal parameters	[AIAA PAPER 92-3366] p 905 A92-48939 HELICOPTER PERFORMANCE	[NLR-TP-90159-U] p 879 N92-28653 LAH-main rotor model test at the DNW
p 901 A92-48353	Flight model for unmanned simulated helicopters	[NLR-TP-90305-U] p 852 N92-28687
HEAT TRANSFER	p 874 A92-46776 Establishing a database for flight in the wakes of	S-76B certification for vertical take-off and landing
Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898	structures p 810 A92-46782	operations from confined areas {NLR-TP-90286-U} p 852 N92-28714
Experimental and numerical studies of radiation emission	Flight deck aerodynamics of a nonaviation ship	A rotorcraft flight database for validation of vision-based
from high-temperature air behind 10 km/s shock waves	p 810 A92-46790 Aeromechanical stability of hingeless helicopter rotors	ranging algorithms
[SAE PAPER 912025] p 790 A92-45417 Multiple shock-shock interference on a cylindrical	in forward flight p 874 A92-46923	[NASA-TM-103906] p 841 N92-29103 Improving the LAMP Mk 3 SH-60B HF communication
leading edge p 813 A92-46899	Relative energy concepts in helicopter dynamics	system
Grid sensitivity in low Reynolds number hypersonic	p 846 A92-46925 Chaotic dynamic behavior in a simplified rotor blade lag	[AD-A245970] p 910 N92-29344 Helicopter low-speed yaw control
continuum flows p 817 A92-47057 Effect of the grid system on heat transfer computations	model p 846 A92-46926	[NASA-CASE-LAR-14219-1] p 879 N92-30025
for high speed flows p 900 A92-47071	Computational aspects of helicopter trim analysis and	Experience with piloted simulation in the development
Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267	damping levels from Floquet theory p 875 A92-46933 Frequency domain flight testing and analysis of an	of helicopters [MBB-UD-0610-91-PUB] p 889 N92-30076
holes p 900 A92-47267 Low density heat transfer phenomena	OH-58D helicopter p 847 A92-46943	HELIUM
[AIAA PAPER 92-2899] p 820 A92-47875	On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945	Remarks on high-Reynolds-number turbulence
The optimization of variable cross-section spines with temperature dependent thermal parameters	A Mach-scaled powered model for rotor-fuselage	experiments and facilities p 881 A92-45267 Power economy in high-speed wind tunnels by choice
p 901 A92-48353	interactional aerodynamics and flight mechanics	of working fluid and temperature p 881 A92-45275
Vane-blade interaction in a transonic turbine. II - Heat	investigations p 847 A92-46960 Advanced Rotorcraft Transmission (ART) Program	HELMET MOUNTED DISPLAYS The evaluation of simulator effectiveness for the training
transfer [AIAA PAPER 92-3324] p 904 A92-48907	summary	of high speed, low level, tactical flight operations
Practical considerations in designing the engine cycle	(AIAA PAPER 92-3365) p 905 A92-48938	p 885 N92-28539
p 869 N92-28460 Second-order shock-expansion theory extended to	Advanced Rotorcraft Transmission (ART) - Component test results	HEMISPHERE CYLINDER BODIES Separation patterns and flow structures about a
include real gas effects	(AIAA PAPER 92-3366) p 905 A92-48939	hemisphere-cylinder at high incidences
[AD-A247191] p 831 N92-29539	HELICOPTER PROPELLER DRIVE Advanced Rotorcraft Transmission (ART) Program	[AIAA PAPER 92-2712] p 807 A92-45593
Effect of walls on the supersonic reacting mixing layer p 912 N92-30065	summary	HIGH ALTITUDE A preliminary design and analysis of an advanced
HEAT TRANSFER COEFFICIENTS	[AIAA PAPER 92-3365] p 905 A92-48938	heat-rejection system for an extreme altitude advanced
The flow pattern and external heat transfer investigation	Application of face-gear drives in helicopter	variable cycle diesel engine installed in a high-altitude
for gas turbine vanes end surfaces [AIAA PAPER 92-3071] p 903 A92-48722	transmissions [NASA-TM-105655] p 908 N92-28434	advanced research platform [NASA-CR-186021] p 871 N92-29427
HEAT TRANSMISSION	Dynamics of a split torque helicopter transmission	HIGH ALTITUDE BALLOONS
Second-order shock-expansion theory extended to	[NASA-TM-105681] p 910 N92-29136	High-altitude lighter-than-air powered platform [SAE PAPER 912054] p 844 A92-45438
include real gas effects [AD-A247191] p 831 N92-29539	HELICOPTER TAIL ROTORS A semi empirical method for the analytical representation	HIGH ASPECT RATIO
HEAT TREATMENT	of stationary measured profile coefficients for applications	An experimental investigation of high-aspect-ratio
Rotor support for the STME oxygen turbopump [AIAA PAPER 92-3282] p 904 A92-48872	of rotary wing aerodynamics	cooling passages [AIAA PAPER 92-3154] p 890 A92-48780
HELICOPTER CONTROL	[ETN-92-91491] p 832 N92-29741 Computed Tomography (CT) as a nondestructive test	HIGH FREQUENCIES
Civil development and certification of a helicopter	method used for composite helicopter components	New methods to determine the transmission loss of
automatic approach and hover system on the Sikorsky S-76	[MBB-UD-0603-91-PUB] p 910 N92-29873	partitions using sound intensity measurements p 924 A92-45879
[SAE PAPER 911975] p 872 A92-45382	HELICOPTER WAKES Free wake analyses of a hovering rotor using panel	HIGH PRESSURE
A new milestone in automatic aircraft control - Fly-by-light	method	Paint removal using cryogenic processes
systems transmit commands optoelectronically p 784 A92-45699	[SAE PAPER 912004] p 789 A92-45405	[AD-A247668] p 895 N92-28912 HIGH RESOLUTION
Modeling of the control systems of rotary wing aircraft	A study of rotor wake development and wake/body	High-altitude lighter-than-air powered platform
(Review) p 875 A92-47783	interactions in hover p 813 A92-46935 A unified procedure for solving rotor flowfield,	[SAE PAPER 912054] p 844 A92-45438 HIGH REYNOLDS NUMBER
A new method of helicopter rotor blade motion control p 875 A92-47786	performance and interference p 814 A92-46950	High Reynolds number flows using liquid and gaseous
Helicopter low-speed yaw control	Efficient high-resolution rotor wake calculations using	helium
[NASA-CASE-LAR-14219-1] p 879 N92-30025	flow field reconstruction p 814 A92-46951	[ISBN 0-387-97475-X] p 897 A92-45261

HIGH SPEED SUBJECT INDEX

High-Reynolds-number test requirements in low-speed **HOT-WIRE ANEMOMETERS** Development of high performance compressor p 787 A92-45263 discharge seal Flow gradient corrections on hot-wire measurements aerodynamics high-Reynolds-number p 907 A92-49096 Remarks on turbulence using an X-wire probe experiments and facilities p 881 A92-45267 [NLR-TP-90255-U] p 829 N92-28713 HYDROXYL RADICALS KrF laser-induced OH fluorescence imaging in a Separation control on high Reynolds number HOVERING supersonic combustion tunnel multi-element airfoils Civil development and certification of a helicopter [AIAA PAPER 92-2636] p 806 A92-45575 p 905 A92-48923 automatic approach and hover system on the Sikorsky Unstructured and adaptive mesh generation for high HYPERBOLIC FUNCTIONS p 872 A92-45382 Hyperbolic grid generation with BEM source terms Revnolds number viscous flows p 816 A92-47042 [SAE PAPER 911975] Development of an efficient analysis for high Reynolds [NLR-TP-90334-U] p 923 N92-28635 Ducted fan VTOL for working platform Hyperbolic grid generation control by panel methods INLR-TP-91061-UI p 924 N92-29604 p 843 A92-45397 number inviscid/viscid interactions in cascades [SAE PAPER 911995] p 823 A92-48723 [AIAA PAPER 92-3073] Free wake analyses of a hovering rotor using panel p 924 N92-29604 A preliminary experimental investigation of local isotropy HYPERSONIC AIRCRAFT method p 789 A92-45405 in high-Reynolds-number turbulence [SAE PAPER 912004] On the aerodynamics/dynamics of store separation from p 912 N92-30042 Navier-Stokes computation of wing leading edge hypersonic aircraft | AIAA PAPER 92-2722 | p 807 A92-45595 HIGH SPEED tangential blowing for a tilt rotor in hover p 805 A92-45568 Prediction of inviscid supersonic/hypersonic aircraft The high speed challenge for rotary wing aircraft [AIAA PAPER 92-2608] p 842 A92-45381 [SAE PAPER 911974] p 810 A92-46785 Sensitivity analysis of discrete periodic systems with flowfields Flow visualisation of a small diameter rotor operating HYPERSONIC BOUNDARY LAYER applications to helicopter rotor dynamics at high rotational speeds with blades at small pitch Measurement of shock-wave/boundary-layer interaction p 846 A92-46884 p 814 A92-46949 in a free-piston shock tunnel p 813 A92-46903 A study of rotor wake development and wake/body Design criteria and analysis of the dynamic behavior p 813 A92-46935 Methods for direct simulation of transition in hypersonic interactions in hover p 912 N92-30064 of high speed, heavily loaded and precision epicyclic gears boundary layers 2 Experimental and computational studies of hovering for aircraft use HYPERSONIC COMBUSTION p 815 A92-46954 rotor flows Shock enhancement and control of hypersonic IAIAA PAPER 92-34911 p 906 A92-49028 HUBS combustion Evaluation of outdoor-to-indoor response to minimized Prediction of dynamic hub load of a rotor executing p 896 N92-29580 sonic booms [NASA-CR-189643] multiple sinusoidal blade pitch variations (AD-A248558) HYPERSONIC FLIGHT p 846 A92-46921 p 927 N92-28556 Numerical analysis of RCS jet in hypersonic flights HIGH TEMPERATURE **HUMAN BEHAVIOR** High-temperature miniaturized turbine engine lubrication The effect on aircraft evacuations of passenger ISAE PAPER 9120631 p 791 A92-45445 p 834 A92-44998 Aerospace plane hydrogen scramjet boosting system simulator behaviour and smoke in the cabin p 891 A92-45451 [SAE PAPER 912071] [AD-A249259] p 868 N92-28294 **HUMAN FACTORS ENGINEERING** Apparatus for elevated temperature compression or EICAS in an integrated cockpit --- Engine Indication Crew Propulsion system performance and integration for high lerting System p 855 A92-44922 Electronic presentation of instrument approach tension testing of specimens [NASA-CASE-LAR-14775-1] Mach air breathing flight p 862 A92-46429 Alerting System p 912 N92-30099 Hypersonic plasma predictions at nonzero angle of HIGH TEMPERATURE AIR p 855 A92-44923 attack information Experimental and numerical studies of radiation emission Perspective versus plan view air traffic control (ATC) [AIAA PAPER 92-3027] p 925 A92-47028 from high-temperature air behind 10 km/s shock waves Analytical and experimental studies of heat pipe radiation displays - Survey and empirical results p 790 A92-45417 [SAE PAPER 912025] cooling of hypersonic propulsion systems p 896 A92-44967 HIGH TEMPERATURE ENVIRONMENTS [AIAA PAPER 92-3809] p 867 A92-49128 Real-time control tower simulation for evaluation of An analysis of combustion studies in shock expansion Elevated temperature crack growth in aircraft engine p 879 A92-44976 airport surface traffic automation p 891 A92-45234 The development of an intelligent human factors data tunnels and reflected shock tunnels materials p 895 N92-28374 HIGH TEMPERATURE FLUIDS INASA-TP-32241 base as an aid for the investigation of aircraft accidents Aerothermodynamics and propulsion integration in the Lubricant evaluation and performance 2 p 928 A92-44994 p 895 N92-28398 LAD-A2474641 Saenger technology programme Airline deregulation - Impact on human factors p 834 A92-44999 [MBB-FE-202-S-PUB-0469-A] HIGH TEMPERATURE GASES p 831 N92-29649 HYPERSONIC FLOW Configuration effects on the ingestion of hot gas into Organizational factors in human factors accident Multidimensional Euler/Navier-Stokes analysis for p 842 A92-45315 the engine intake investigation p 834 A92-45000 Hot gas innestion characteristics and flow visualization hypersonic equilibrium gas Eliminating pilot-caused altitude deviations - A human p 790 A92-45418 p 834 A92-45041 (SAE PAPER 912026) of a vectored thrust STOVL concept factors approach p 860 A92-45316 Empirical foundations and sensitivity testing - Is it enough Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback Hot-gas reingestion - Engine response considerations for the 90's? n 835 A92-45054 p 860 A92-45317 ICAO Flight Safety and Human Factors Programme sharp fins in hypersonic flows Contingency power for a small turboshaft engine by using p 835 A92-45055 ISAE PAPER 9120441 p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over water injection into turbine cooling air Mandatory psychological testing of pilots as a p 871 N92-29661 [NASA-TM-105680] space vehicles requirement for licensing in Norway? (SAE PAPER 912045) HIGH TEMPERATURE LUBRICANTS p 835 A92-45081 p 791 A92-45429 LU-SGS implicit scheme for entry vehicle flow Lubricant evaluation and performance 2 HUMAN PERFORMANCE [AD-A247464] p 895 N92-28398 computation and comparison with aerodynamic data An analysis of aircrew communication patterns and p 798 A92-45526 flows around a HIGH TEMPERATURE SUPERCONDUCTORS I AIAA PAPER 92-26711 Computations of hypersonic Superconducting bearings with levitation control LAD-A2466181 p 907 N92-28253 three-dimensional concave/convex body configurations HYDRAULIC EQUIPMENT INASA-CASE-GSC-13346-11 I AIAA PAPER 92-26061 p 805 A92-45570 p 909 N92-29099 Space Shuttle Orbiter auxiliary power unit status HIGHLY MANEUVERABLE AIRCRAFT p 889 A92-45442 Aerothermodynamics of a 1.6-meter-diameter sphere in ISAE PAPER 9120601 control Development of the DDV actuation system on the IDF hypersonic rarefied flow p 808 A92-45840 Separated high enthalpy dissociated laminar hypersonic Nonlinear inversion flight for p 873 A92-46751 supermaneuverable aircraft flow behind a step - Pressure measurements [SAE PAPER 912080] p 844 A92-45455 Feedback control laws for highly maneuverable p 809 A92-45858 D 876 A92-48491 Simple fly-by-wire actuato aircraft Hypersonic rarefied flow about a delta wing - direct [NASA-CR-190535] p 879 N92-29654 HYDROCARBON COMBUSTION simulation and comparison with experiment HISTORIES A simplified reaction mechanism for prediction of NO(x) p 812 A92-46892 emissions in the combustion of hydrocarbons NASA engineers and the age of Apollo p 894 A92-48919 [AIAA PAPER 92-3340] [NASA-SP-4104] p 929 N92-28344 Grid sensitivity in low Reynolds number hypersonic Experimental investigation of liquid carbonhydrogen fuel continuum flows p 817 A92-47057 HOLOGRAPHIC INTERFEROMETRY combustion in channel at supersonic velocities Calculation of hypersonic, viscous, non-equilibrium flows Comparison of interferometric measurements with 3-D I AIAA PAPER 92-3429] p 894 A92-48986 around reentry bodies using a coupled boundary Euler computations for circular cones in supersonic flow HYDROCARBON FUELS [AIAA PAPER 92-2691] laver/Fuler method p 800 A92-45538 Enhancing the performance characteristics of engine [AIAA PAPER 92-2856] p 819 A92-47839 HOMING DEVICES fuels by means of surfactant additives A radar signal processing ASIC and a VME interface Computation of hypersonic flowfields in thermal and p 892 A92-46631 chemical nonequilibrium p 859 N92-28380 circuit Analysis of a hydrocarbon scramjet with augmented [AIAA PAPER 92-2874] p 819 A92-47856 HOMOGENEOUS TURBULENCE preburning [AIAA PAPER 92-3425] Computation of 3-D hypersonic flows in chemical Non-linear interactions in homogeneous turbulence with p 865 A92-48984 non-equilibrium including transport phenomena and without background rotation p 912 N92-30044 HYDRODYNAMIC RAM EFFECT p 820 A92-47858 [AIAA PAPER 92-2876] HONEYCOMB STRUCTURES High spatial resolution measurements of ram accelerator Laminar hypersonic flow over a compression using the Flow quality studies of the NASA Lewis Research Center gas dynamic phenomena HANA code p 903 A92-48844 8- by 6-foot supersonic/9- by 15-foot low speed wind [AIAA PAPER 92-3244] [AIAA PAPER 92-2896] Progress towards the development of transient ram p 820 A92-47872 INASA-TM-1054171 p 887 N92-28673 Numerical and experimental investigation of rarefied accelerator simulation as part of the U.S. Air Force compression corner flow HORIZONTAL FLIGHT Armament Directorate Research Program p 820 A92-47876 [AIAA PAPER 92-29001 Optimization of constant altitude-constant airspeed flight | AIAA PAPER 92-3248 | p 904 A92-48847 p 845 A92-46815 Solution of the Burnett equations for hypersonic flows of turbojet aircraft The External Propulsion Accelerator - Scramjet thrust HORSESHOE VORTICES without interaction with accelerator barrel near the continuum limit p 821 A92-47894 p 866 A92-49098 I AIAA PAPER 92-2922 I Investigation of three-dimensional flow field in a turbine [AIAA PAPER 92-3717] A scramjet nozzle experiment with hypersonic external including rotor/stator interaction. II - Three-dimensional **HYDROSTATICS** flow field at the exit of the nozzle Variable displacement electro-hydrostatic actuator --- for

IAIAA PAPER 92-32891

p 876 A92-48492

p 864 A92-48878

1AIAA PAPER 92-33261

p 826 A92-48909

flight control systems

Similarity relations for calculating three	-dimensional
chemically nonequilibrium viscous flows	A92-49188
Feasibility study of hypersonic	clinometric
measurements at R3Ch ONERA-RSF-136/1865-AY-728- p 829	N92-28789
Hypersonic flow past radiation-cooled surf	aces N92-29713
MBB-FE-202-S-PUB-0468-A p 832 YPERSONIC HEAT TRANSFER	N92-29713
Hypersonic flow past radiation-cooled surf [MBB-FE-202-S-PUB-0468-A] p 832	aces N92-29713
HYPERSONIC INLETS	1402-23710
Multiple shock-shock interference on a leading edge p 813	
Comparative study of turbulence models	
hypersonic inlet flows [AIAA PAPER 92-3098] p 824	A92-48740
HYPERSONIC NOZZLES Experience in the operation of a hypersonic	nozzle static
thrust stand	
AIAA PAPER 92-3292 p 882 HYPERSONIC REENTRY	A92-48881
A transonic/supersonic/hypersonic CFD at	nalysis of the
entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805	A92-45571
Aerothermodynamics of a 1.6-meter-diame hypersonic rarefied flow p 808	ter sphere in A92-45840
TYPERSONIC SHOCK	
Measurement of shock-wave/boundary-lay in a free-piston shock tunnel p 813	er interaction A92-46903
IYPERSONIC SPEED	
An investigation of passive control re shock-induced separation at hypersonic spe-	
[AIAA PAPER 92-2725] p 808	A92-45596
Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808	A92-45597
Thrust/speed effects on long-term of aerospace planes p 889	lynamics of A92-46766
TYPERSONIC VEHICLES	
Numerical simulations of hypersonic real-gaspace vehicles	as flows over
[SAE PAPER 912045] p 791	A92-45429
Numerical simulation of aerothermal loads i engine inlets due to shock impingement	n hypersonic
[AIAA PAPER 92-2605] p 792 Aerodynamic shape optimization of	A92-45482
configurations including viscous effects	hypersonic
[AIAA PAPER 92-2635] p 795 High-speed flight propulsion systems Br	A92-45506 pok
[ISBN 1-56347-011-X] p 862 Introduction propulsion system perf	A92-46426
hypersonic vehicles p 862	A92-46427
Energy analysis of high-speed flight syster p 925	ns A92-46430
	erodynamics
results p 812	A92-46890
Joint computational/experimental a research on hypersonic vehicle. II - Co	erodynamics moutational
results p 812	A92-46891
	A92-47875
Heat transfer characteristics of hypersoni with an emphasis on leading edge effects	c waveriders
[AIAA PAPER 92-2920] p 821 Analysis of a hydrocarbon scramjet with	
preburning	_
[AIAA PAPER 92-3425] p 865 Acquisition of an aerothermodynamic d	A92-48984 lata base by
means of a winged experimental reentry veh	
[MBB/FE202/S/PUB/461] p 787 IYPERSONIC WIND TUNNELS	
Joint computational/experimental a research on a hypersonic vehicle. I - E	erodynamics xperimental
results p 812 Numerical and experimental investigation	A92-46890
compression corner flow	
[AIAA PAPER 92-2900] p 820 New hypersonic test methods developed	A92-47876 at ONERA -
The R5 and F4 wind tunnels	A92-48600
Instrumentation requirements for laminar f	
in the NLR high speed wind tunnel HST [NLR-TP-89158-U] p 887	N92-28669
TYPERSONICS	
aerospace planes p 889	
A comparative study of scramjet injection:	strategies for
high Mach numbers flows	-

[AIAA PAPER 92-3287]

HYPERVELOCITY PROJECTILES

Two variations of certainty control

p 918 A92-46762

ys	
p 827 A92-49188	ICE
sonic clinometric	Experime
	resulting dra
p 829 N92-28789	[NASA-TM- ICE CLOUDS
ed surfaces p 832 N92-29713	Remote n
p 632 1492-29713	water during
ed surfaces	
p 832 N92-29713	ICE FORMAT LDV mea
	simulated gl
e on a cylindrical	AIAA PAPE
p 813 A92-46899	Remote n
nodels in predicting	water during
p 824 A92-48740	Assessme
-	applied to s
ersonic nozzle static	Computat
	AIAA PAPE
p 882 A92-48881	Experime
CFD analysis of the	resulting dra NASA-TM-
Or D arialysis of the	Results o
p 805 A92-45571	a new meth
-diameter sphere in	INASA-TM-
p 808 A92-45840	ICE PREVENT
	Results o
ary-layer interaction	a new meth NASA-TM-
p 813 A92-46903	IGNITION
	Experime
ntrol methods for	combustion
nic speeds p 808 A92-45596	[AIAA PAPE
dies	IGNITION LIN
p 808 A92-45597	Ignition de
erm dynamics of	of aluminus combustion
p 889 A92-46766	[AIAA PAPE
	IMAGE PROC
real-gas flows over	Results o
. 704 . 400 45400	a new meth
p 791 A92-45429	INASA-TM-
loads in hypersonic	Binary o recognition
p 792 A92-45482	[NASA-TM-
•	IMAGE ROTA
is	Multi-char
p 795 A92-45506	fiber
s Book	[AD-D01527
p 862 A92-46426	IMAGERY
m performance for p 862 A92-46427	The role support by s
y 602 A92-40421	A rotorcra
systems p 925 A92-46430	ranging algo
al aerodynamics	(NASA-TM-
al aerodynamics I - Experimental	IMAGING TEC
p 812 A92-46890	Simultan
al aerodynamics I - Computational	visualization
p 812 A92-46891	Bistatic so
na	
p 820 A92-47875	KrF lase
ersonic waveriders	supersonic
ects	(AIAA PAPE Results o
p 821 A92-47892	a new meth
et with augmented	[NASA-TM-
p 865 A92-48984	IMPACT RES
amic data base by	An analys
try vehicle	resistance of
p 787 N92-30232	(SAE PAPE
al accordinación	IMPACT TEST
al aerodynamics	Impact re
al aerodynamics . I - Experimental p 812 A92-46890	(SAE PAPE
stigation of rarefied	Drop test: (DOT/FAA/
	IN-FLIGHT M
p 820 A92-47876	Real time
eloped at ONERA -	
n 992 A02 40600	INCENDIARY
p 882 A92-48600 minar flow research	Modular
minar now research	pressure
p 887 N92-28669	[AD-A24820
	INCOMPRESS
erm dynamics of	Simplified
p 889 A92-46766	separated b
action etratogics for	Multi-poin
ection strategies for	airfoils
p 904 A92-48876	[AlAA PAPE
	Prediction

```
Applied Computational Aerodynamics - Case studies
                                                              [AIAA PAPER 92-2661]
                                                                                                p 845 A92-45580
                                                                Separation patterns and flow structures about a
           ntal and computational ice shapes and
                                                              hemisphere-cylinder at high incidences
           ng increase for a NACA 0012 airfoil
                                                             [AIAA PAPER 92-2712] p 807 A92-45593
Numerical method for predicting transition in
                                   p 828 N92-28674
                                                              three-dimensional flows by spatial amplification theory
           neasurements of supercooled integrated liquid
                                                                                                 p 812 A92-46886
           g WISP/FAA aircraft icing program
                                                                Establishing two-dimensional flow in a large-scale planar
                                   p 915 A92-46788
                                                             turbine cascade
[AIAA PAPER 92-3066]
                                                                                                 p 823 A92-48720
           surements on a rectangular wing with a
                                                                Pulse jet one-way valve performance
                                                              [AIAA PAPER 92-3169]
           aze ice accretion
                                                                                                p 863 A92-48790
                                                              A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2:
                                   p 800 A92-45537
           neasurements of supercooled integrated liquid
           g WISP/FAA aircraft icing program
                                                             Description of computer program VORSEP
[NLR-TR-86006-U] p 833
                                   p 915 A92-46788
                                                                                                 p 833 N92-29916
           ent of one-dimensional icing forecast model
                                                           INDEXES (DOCUMENTATION)
           tratiform clouds
                                   p 915 A92-46803
                                                               Aeronautical Engineering Group publications, 1950 -
           ional icing analysis for aircraft inlets
                                                              present
           ER 92-3178 p 836 A92-48793 ntal and computational ice shapes and
                                                              AERO-REPT-8907
                                                                                                 p 910 N92-29683
                                                           INDUCED DRAG
           ag increase for a NACA 0012 airfoil
                                                               Wing design for hanggliders having minimum induced
           105743]
                                  p 828 N92-28674
                                                                                                 p 811 A92-46814
           of a low power ice protection system test and
                                                           INDUCTION MOTORS
           od of imaging data analysis
                                                               Electromechanical systems with transient high power
                                   p 828 N92-28696
           105745]
                                                              esponse operating from a resonant AC link
                                                                                                 p 870 N92-28985
           TION
                                                             [NASA-TM-105716]
           f a low power ice protection system test and
                                                           INERTIAL NAVIGATION
                                                             An integrated navigation system manager using federated Kalman filtering p 858 A92-48477
           od of imaging data analysis
                                   p 828 N92-28696
           105745]
                                                           INERTIAL PLATFORMS
           ntal investigation of liquid carbonhydrogen fuel
                                                               Motion errors in an airborne synthetic aperture radar
           in channel at supersonic velocities
                                                              system
                                                                                                 p 840 A92-48416
                                   p 894 A92-48986
                                                           INFORMATION MANAGEMENT
           AITS
                                                               Lessons learned about information management within
           elays, heats of combustion, and reaction rates
                                                               ne Pilot's Associate program p 916 A92-44909
EICAS in an integrated cockpit --- Engine Indication Crew
                                                              the Pilot's Associate program
           n alkyl derivatives used as ignition and
           enhancers for supersonic combustors
                                                                                                 p 855 A92-44922
            R 92-3841 J
                                   p 894 A92-49134
                                                               Electronic presentation of
                                                                                            instrument approach
           ESSING
                                                                                                 p 855 A92-44923
                                                              information
           of a low power ice protection system test and
                                                           INFORMATION SYSTEMS
           od of imaging data analysis
                                                               MassInfo - An intelligent mass properties information
                                   p 828 N92-28696
           105745]
                                                                                                 p 928 A92-47628
                                                              system
           optical filters for scale invariant pattern
                                                           INFRARED IMAGERY
                                                               Time-to-go estimation from infrared images
                                                                                                 p 840 A92-48308
           103902]
                                   p 853 N92-28910
           TION
                                                           INGESTION (ENGINES)
           nnel fiber optic rotary joint for single-mode
                                                               Configuration effects on the ingestion of hot gas into
                                                                                                p 842 A92-45315
                                                              the engine intake
                                   p 927 N92-29095
                                                               Hot gas ingestion characteristics and flow visualization
                                                             of a vectored thrust STOVL concept
           of simulation for the study of APIS (piloting
                                                                                                 p 860 A92-45316
                                   p 885 N92-28544
           (vnthetic imagery)
                                                               Hot-gas reingestion - Engine response considerations
           ft flight database for validation of vision-based
                                                                                                 p 860 A92-45317
           rithms
                                   p 841 N92-29103
           1039061
                                                               Coupled numerical simulation of the external and engine
           CHNIQUES
                                                             inlet flows for the F-18 at large incidence
           eous imaging and interferometric turbule
                                                                                                p 793 A92-45493
                                                             [AIAA PAPER 92-2621]
            in a high-velocity mixing/shear layer
                                                               LDA measurements in a Mach 2 flow over a rearward
                                   p 896 A92-45130
                                                              facing step with staged transverse injection
           cattering on a monostatic radar range
                                                             [AIAA PAPER 92-2692]
                                                                                                p 800 A92-45539
                                   p 849 A92-48408
                                                               Numerical simulations using a dynamic solution-adaptive
           r-induced OH fluorescence imaging in a
                                                              grid algorithm, with applications to unsteady internal
           combustion tunnel
                                                              lows
                                                                                                 p 803 A92-45557
                                   p 905 A92-48923
           R 92-33461
                                                             [AIAA PAPER 92-2719]
            a low power ice protection system test and
                                                               Comparative study of turbulence models in predicting
           od of imaging data analysis
                                                              hypersonic inlet flows
                                   p 828 N92-28696
                                                                                                 p 824 A92-48740
                                                             [AIAA PAPER 92-3098]
           STANCE
                                                               Computational analysis of ramjet engine inlet
           is of the effect of centrifugal force on the impact
                                                              interaction
                                                             [AIAA PAPER 92-3102]
                                                                                                 p 824 A92-48744
            f composite fan blades for turbo-fan engines
           R 9120471
                                   p 861 A92-45431
                                                               A Navier-Stokes analysis of a controlled-diffusion
                                                              compressor cascade at increasing inlet-flow angles
           rs
           sponse of composite UHB propeller blades
                                                             [AIAA PAPER 92-3313]
                                                                                                p 825 A92-48899
                                                               Inlet distortion effects in aircraft propulsion system
           R 912046
                                   p 861 A92-45430
                                                             integration
            Cessna Golden Eagle 421B
                                   p 837 N92-28900
                                                           INLET PRESSURE
           CT-TN91/321
                                                               Calculation of installation effects within performance
           ONITORING
                                                              computer programs
           presentation for RAFALE in-flight tests
                                   p 882 A92-47522
                                                               The design of test-section inserts for higher speed
            AMMUNITION
                                                              aeroacoustic testing in the Ames 80- by 120-foot wind
           simulation of HEI fragments and blast
                                                             [NASA-TM-103915]
                                                                                                 p 927 N92-28909
                                   p 910 N92-29191
                                                           INSPECTION
           SIBLE BOUNDARY LAYER
                                                               Turbine aircraft engine operational trending and JT8D
           linear stability transition prediction method for
                                                              static component reliability study
                                   p 812 A92-46883
           oundary layers
                                                             [DOT/FAA/CT-91/10]
                                                                                                 p 870 N92-28686
           SIBLE FLOW
                                                               Federal Aviation Administration
                                                                                                   aging aircraft
           nt inverse design of an infinite cascade of
                                                             nondestructive inspection research plan
                                                                                                 p 914 N92-30116
           ER 92-26501
                                   p 797 A92-45517
                                                               Inspection of aging aircraft:
                                                                                                 A manufacturer's
    rediction of laminar boundary layer using cubic
                                                                                                 p 914 N92-30117
                                                               NDE research efforts at the FAA Center for Aviation
                                                                                                 p 914 N92-30119
[AIAA PAPER 92-2702]
                                   p 801 A92-45544
                                                             Systems Reliability
```

A comparison of the calculated and experimental Aging aircraft NDI Development and Demonstration The calculation of three-dimensional compressible Center (AANC): An overview --off-design performance of a radial flow turbine nondestructive boundary layer stability on swept wings p 818 A92-47684 p 915 N92-30120 NASA-CR-189207 p 831 N92-29402 Nondestructive inspection perspectives An improved multiple line-vortex method for simulation ION BEAMS p 915 N92-30121 Report on the workshop on lon implantation and lon of separated vortices of slender wings Ageing airplane repair assessment program for Airbus p 819 A92-47694 Beam Assisted Deposition p 838 N92-30123 A300 LAD-A250561 L p 927 N92-28923 Aerodynamic sensitivities for subsonic lifting-surface Survey of French activities concerning structural inworthiness and aging aircraft p 838 N92-30130 p 819 A92-47695 ION IMPLANTATION airworthiness and aging aircraft Report on the workshop on Ion Implantation and Ion Calculation of fully three-dimensional separated flows Aging commuter aeroplanes: Fatigue evaluation and Beam Assisted Deposition ith an unsteady viscous-inviscid interaction method p 821 A92-48577 IAD-A2505611 control methods p 915 N92-30132 IONERA, TP NO. 1992-11 p 927 N92-28923 INSTRUCTORS Computational analysis of ramjet engine inlet A training program for airline line instructors Hypersonic plasma predictions at nonzero angle of p 835 A92-45044 p 824 A92-48744 I AIAA PAPER 92-31021 attack [AIAA PAPER 92-3027] INSTRUMENT APPROACH Vane-blade interaction in a transonic turbine, I p 925 A92-47028 Electronic presentation of instrument Aerodynamics ISOLATION p 855 A92-44923 p 825 A92-48906 information (AIAA PAPER 92-3323) Active thermal isolation for temperature responsive Loran-C performance assurance assessment program INTERACTIONS sensors [NASA-CR-190469] p 840 N92-28718 [NASA-CASE-LAR-14612-1] Non-linear interactions in homogeneous turbulence with p 911 N92-29954 INSTRUMENT COMPENSATION and without background rotation **ISOLATORS** p 912 N92-30044 IsoDoppler and mocomp corrections improve MTI Active thermal isolation for temperature responsive INTERCEPTORS p 898 A92-45774 Two variations of certainty control INSTRUMENT ERRORS p 918 A92-46762 [NASA-CASE-LAR-14612-1] p 911 N92-29954 Radioaltimeter RWL-750 p 855 A92-45374 INTERFEROMETERS ISOTROPIC TURBULENCE A preliminary experimental investigation of local isotropy Reconstruction of flight path in turbulence Simultaneous imaging and interferometric turbule p 874 A92-46777 visualization in a high-velocity mixing/shear layer in high-Reynolds-number turbulence INSTRUMENT FLIGHT RULES o 896 A92-45130 p 912 N92-30042 ITERATIVE SOLUTION Operational evaluation of a tower workstation for Study of optical techniques for the Arnes unitary wind p 879 A92-44981 clearance delivery tunnels. Part 3: Angle of attack Acoustic spinning-mode analysis by iterative threshold INSTRUMENT LANDING SYSTEMS p 888 N92-29655 INASA-CR-1905411 method applied to a helicopter turboshaft engine The appropriate concern for possible aberrations in INTERMETALLICS [ONERA, TP NO. 1992-41] p 926 A92-48602 landing guidance signals p 839 A92-44932 Axial alignment of short-fiber titanium aluminide Simulation of triple simultaneous parallel ILS composites by directional solidification p 880 A92-45025 p 892 A92-46838 INSTRUMENT PACKAGES INTERNATIONAL COOPERATION JET AIRCRAFT Modern techniques for monitoring airborne telemetry Internationalization of telemetry systems Jet-powered V/STOL aircraft - Lessons learned p 857 A92-47560 p 920 A92-47535 p 841 A92-45304 INSULATION German-GUS cooperation in civil aviation p 785 A92-47592
INTERPROCESSOR COMMUNICATION
Application of VMT Aircraft Command in Emergency Situations (ACES) Performance of uncoated AFRSI blankets during [SAE PAPER 912039] multiple Space Shuttle flights p 835 A92-45424 Recent CFD applications on jet transport Application of VME-technology on an airborne data link INASA-TM-1038921 p 890 N92-29104 configurations INTEGRATED CIRCUITS rocessor unit [AIAA PAPER 92-2658] p 844 A92-45519 VHDL design and simulation for airborne graphics [NLR-MP-88040-U] p 841 N92-29615 on two-dimensional Effect of throat contouring generation requirements --- VLSI hardware description INVARIANCE p 902 A92-48465 converging-diverging nozzles using URS method Binary optical filters for scale invariant pattern recognition language [AIAA PAPER 92-2659] p 797 A92-45520 Applications of silicon hybrid multi-chip modules to Optimum cruise lift coefficient in initial design of jet avionics p 859 N92-28379 [NAŠA-TM-103902] p 853 N92-28910 p 845 A92-46806 aircraft INTEGRATED OPTICS INVERSE KINEMATICS Optimization of constant altitude-constant airspeed flight Potential for integrated optical circuits in advanced Inverse control problems: Mathematical preliminaries, of turbojet aircraft p 845 A92-46815 aircraft with fiber optic control and monitoring systems system theoretical approaches, and their applications to Interactive algebraic mesh generation for twin jet p 856 A92-46246 aircraft dynamics Integrated optic components for advanced turbine transport aircraft D 817 A92-47064 p 923 N92-28581 Effective cueing during approach and touchdown: engine control systems
INTERACTIONAL AERODYNAMICS p 925 A92-46248 INVESTMENT CASTING Comparison with flight p 886 N92-28552 Manufacturing technology methodology for propulsion JET AIRCRAFT NOISE An economic approach to accurate wing design system parts Full Navier-Stokes analysis of a two-dimensional p 789 A92-45408 ISAE PAPER 9120081 [AIAA PAPER 92-3525] p 906 A92-49048 mixer/ejector nozzle for noise suppression Aerodynamic characteristics near the tip of a finite wing INVISCID FLOW [NASA-TM-105715] p 868 N92-28419 by a panel method An unfactored implicit scheme for 3D inviscid transonic Jet aircraft noise at high subsonic flight Mach ISAE PAPER 9120201 p 790 A92-45413 Aerodynamic heating in three-dimensional shock wave [AIAA PAPER 92-2668] numbers n 798 A92-45523 [DLR-FB-91-28] p 928 N92-29997 turbulent boundary layer interaction induced by sweptback Comparison of interferometric measurements with 3-D JET ENGINE FUELS sharp fins in hypersonic flows Euler computations for circular cones in supersonic flow Performance of hybrid ball bearings in oil and jet fuel ISAE PAPER 912044₽ p 791 A92-45428 [AIAA PAPER 92-2691] n 800° A92-45538 p 900 A92-47176 Boundary-layer measurements during a parallel Transonic unsteady inviscid and viscous flow's JET ENGINES blade-vortex interaction simulation around 2-D moving bodies Hot-gas reingestion - Engine response considerations [AIAA PAPER 92-2623] p 794 A92-45495 [AIAA PAPER 92-2704] p 801 A92-45546 p 860 A92-45317 Airfoil pressure measurements during oblique shock Numerical simulations using a dynamic solution-adaptive Numerical analysis of RCS jet in hypersonic flights wave-vortex interaction in a Mach 3 stream grid algorithm, with applications to unsteady internal ISAE PAPER 9120631 p 791 A92-45445 p 795 A92-45503 Derivation of ABCD system matrices from nonlinear Experimental development of spanwise vortex models [AIAA PAPER 92-2719] p 803 A92-45557 dynamic simulation of jet engines with streamwise decay due to wall interaction Calculation of potential flow around airfoils using a [AIAA PAPER 92-3319] [AIAA PAPER 92-2688] p 923 A92-48903 p 799 A92-45535 discrete vortex method p 808 A92-45827 JÈT FLOW The inviscid compressible Goertler problem in Vortex-in-cell analysis of wing wake roll-up Prediction and measurement of jet flowfield features for [AIAA PAPER 92-2703] p 801 A92-45545 three-dimensional boundary layers p 809 A92-46441 ASTOVL aircraft Quantification of canard and wing interactions using Prediction of inviscid supersonic/hypersonic aircraft p 787 A92-45318 The effects of nozzle exit geometry on forebody vortex spatial correlation velocimetry p 810 A92-46785 control using blowing [AIAA PAPER 92-2603] p 807 A92-45588 [AIAA PAPER 92-2687] Simulation of transonic flow over twin-jet transport p 792 A92-45480 Effect of a fan of rarefaction waves on the development p 811 A92-46793 aircraft Simulation of transonic flow over twin-jet transport of disturbances in a supersonic boundary layer Some exact and numerical results for plane steady aircraft p 811 A92-46793 p 809 A92-46519 sheared flow of an incompressible inviscid fluid JET IMPINGEMENT p 821 A92-48019 Self-induced roll oscillations of low-aspect-ratio The experimental and computational study of let Development of an efficient analysis for high Reynolds p 874 A92-46802 rectangular wings impingement flowfields with reference to VSTOL aircraft number inviscid/viscid interactions in cascades Comment on 'Canard-wing interaction in unsteady performance p 787 A92-45324 [AIAA PAPER 92-3073] p 823 A92-48723 supersonic flow' p 812 A92-46820 Numerical simulation of a supersonic jet impingement A fast, uncoupled, compressible, two-dimensional, Two-stream, supersonic, wake flowfield behind a thick on a ground unsteady boundary layer algorithm with separation for base, I - General features p 813 A92-46895 [SAE PAPER 912014] p 789 A92-45412 engine inlets Multiple shock-shock interference on a cylindrical Shock interaction [AIAA PAPER 92-3082] p 823 A92-48729 induced by leading edge p 813 A92-46899 Interface of an uncoupled boundary layer algorithm with Measurement of shock-wave/boundary-layer interaction [SAE PAPER 912043] p 790 A92-45427 an inviscid core flow algorithm for unsteady supersonic in a free-piston shock tunnel p 813 A92-46903 Numerical analysis of RCS jet in hypersonic flights engine inlets [SAE PAPER 912063] Interaction between a rotor tip vortex and a separated p 823 A92-48730 [AIAA PAPER 92-3083] p 791 A92-45445 p 814 A92-46947 Development of an unsteady three-dimensional JET MIXING FLOW A Mach-scaled powered model for rotor-fuselage viscous-inviscid interaction numerical method for the

calculation of airfoils vibration

[ONERA-RSF-7/3617-AY-022A]

Experimental study of cross-stream mixing in a

p 903 A92-48735

rectangular duct

1AIAA PAPER 92-30901

p 830 N92-29206

investigations

interactional aerodynamics and flight mechanics

p 847 A92-46960

SUBJECT INDEX **LEADING EDGES**

A 4-spot time-of-flight anemometer for small centrifugal The enhancement of mixing in high-speed heated jets The design and testing of an airfoil with hybrid laminar compressor velocity measurements [NASA-TM-105717] using a counterflowing nozzle [ONERA, TP NO. 1992-22] I AIAA PAPER 92-32621 p 825 A92-48857 n 822 A92-48585 p 909 N92-29105 Turbulent spot generation and growth rates in a transonic LASER APPLICATIONS Supersonic jet mixing enhancement by 'delta-tabs' [AIAA PAPER 92-3548] boundary layer p 826 A92-49063 Study of optical techniques for the Ames unitary wind LAD-A2502211 p 909 N92-29118 tunnels. Part 3: Angle of attack JET NOZZLES LAMINAR FLOW p 888 N92-29655 Full Navier-Stokes analysis of a two-dimensional INASA-CR-1905411 A new approach for the calculation of transitional LASER DOPPLER VELOCIMETERS mixer/ejector nozzle for noise suppression [NASA-TM-105715] p 868 Swirl number effects on confined flows in a model of p 868 N92-28419 flows [AIAA PAPER 92-2669] p 798 A92-45524 p 896 A92-45202 JET THRUST a dump combustor Concepts for the stability analysis of NLF-experiments LDV measurements in the three-dimensional near wake Thrust stand evaluation of engine performance on swept wings [AIAA PAPER 92-2706] of a stationary and oscillating rectangular wind improvement algorithms in an F-15 airplane p 801 A92-45548 [AIAA PAPER 92-2689] [AIAA PAPER 92-3747] p 866 A92-49111 p 799 A92-45536 Turbulent drag reduction by laminar sublayer LDV measurements on a rectangular wing with a thickening simulated glaze ice accretion [AIAA PAPER 92-2690] p 800 A92-45537 Laser velocimetry measurements in an MHD [AIAA PAPER 92-2707] K Separated high enthalpy dissociated laminar hypersonic flow behind a step - Pressure measurements aerodynamic duct K-EPSILON TURBULENCE MODEL p 809 A92-45858 [AIAA PAPER 92-2986] p 899 A92-46996 Predictions of a turbulent backward-facing-step flow with Laminar hypersonic flow over a compression using the Potential applications of laser Doppler anemometry for a cubic pressure-strain model HANA code in-flight measurements [NLR-TP-90163-U] [AIAA PAPER 92-2647] [AIAA PAPER 92-2896] p 820 A92-47872 p 859 N92-28654 Navier-Stokes analysis and experimental data Instrumentation requirements for laminar flow research Comparison of LDA and LTA applications for propeller comparison of compressible flow in a diffusing S-duct tests in wind tunnels [NLR-MP-88031-U] in the NLR high speed wind tunnel HST [AIAA PAPER 92-2699] p 800 A92-45541 [NLR-TP-89158-U] p 887 N92-28669 p 827 N92-28658 Development and application of a zonal k-epsilon Active thermal isolation for temperature responsive LASER HEATING turbulence model for complex 3-D flowfields sensors Laser-initiated conical detonation wave for supersonic p 903 A92-48792 IAIAA PAPER 92-31761 [NASA-CASE-LAR-14612-1] combustion, III KALMAN FILTERS LAMINAR FLOW AIRFOILS [AIAA PAPER 92-3247] p 893 A92-48846 Laminar separation bubbles and airfoil design at low Design and implementation of a generic Kalman filter LASER INDUCED FLUORESCENCE p 858 A92-48475 Revnolds numbers KrF laser-induced OH fluorescence imaging in a p 797 A92-45515 [AIAA PAPER 92-2735] An integrated navigation system manager using upersonic combustion tunnel Effect of a bulge on the subharmonic instability of federated Kalman filtering I AIAA PAPER 92-33461 p 858 A92-48477 p 905 A92-48923 p 898 A92-45833 subsonic boundary layers LATERAL CONTROL Location and tracking technique in a multistatic system The design and testing of an airfoil with hybrid laminar A LEX blowing technique for post-stall lateral control established by multiple bistatic systems flow control of trapezoidal wings [AIAA PAPER 92-2714] [ONERA, TP NO. 1992-22] p 822 A92-48585 p 802 A92-45553 KELVIN-HELMHOLTZ INSTABILITY The A320 laminar fin programme Initial validation of a R/D simulator with large amplitude Relationship between the instability waves and noise [ONERA, TP NO. 1992-23] p 849 A92-48586 p 886 N92-28546 motion of high-speed jets p 924 A92-45835 The windtunnel as a tool for laminar flow research Effects of cockpit lateral stick characteristics on handling KINEMATICS p 887 N92-28661 INLR-TP-90145-U1 qualities and pilot dynamics Quaternion and Euler angles in kinematics Instrumentation requirements for laminar flow research p 878 N92-28584 INASA-CR-44431 INAL-TM-6361 p 909 N92-28836 in the NLR high speed wind tunnel HST LATERAL STABILITY KINETIC ENERGY p 887 N92-28669 INLR-TP-89158-U1 Estimation of spaceplane lateral-directional stability and The relationship between mode localization and energy LAMINATES control derivatives from dynamic wind tunnel test transmission parameters in the vibration of coupled Impact response of composite UHB propeller blades [SAE PAPER 911979] p 872 A92-45384 p 925 A92-45921 (SAF PAPER 912046) SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact LEADING EDGE FLAPS Relative energy concepts in helicopter dynamics Dynamically enhanced sustained lift using oscillating p 846 A92-46925 resistance of composite fan blades for turbo-fan engines leading-edge flaps KNOWLEDGE BASES (ARTIFICIAL INTELLIGENCE) (SAE PAPER 912047) p 861 A92-45431 (AIAA PAPER 92-2625) p 794 A92-45497 Linear analysis of naturally curved and twisted The importance of implicit and explicit knowledge in a Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions anisotropic beam pilot's associate system p 858 A92-48567 p 899 A92-46936 Application of knowledge-based systems for diagnosis Dynamic analysis of rotor flex-structure based on p 815 A92-46957 LEADING EDGES of aircraft systems nonlinear anisotropic shell models p 899 A92-46946 [NLR-TP-90192-U] p 837 N92-28655 Flow field around thick delta wing with rounded leading Sensitivity of tire response to variations in material and KNOWLEDGE REPRESENTATION p 900 A92-47128 geometric parameters [SAE PAPER 912009] p 789 A92-45409 Knowledge-sensitive task manipulation - Acquiring Tensile and interlaminar properties of GLARE (trade Computational study of transition front on a swept wing knowledge from pilots flying a motion-based flight p 916 A92-45064 leading-edge model [AIAA PAPER 92-2630] simulator IAD-A2501881 p 895 N92-28921 p 795 A92-45502 Getting test items to measure knowledge at the level Repair procedures for advanced composites for of complexity which licensing authorities desire - Another The subsonic and transonic flow around the leading edge helicopters of a thin airfoil with a parabolic nose p 835 A92-45080 dimension to test validity [MBB-UD-0606-91-PUB] p 787 N92-29874 An explanation-based-learning approach to knowledge [AIAA PAPER 92-2649] p 797 A92-45516 LANDING AIDS Analysis of a pneumatic forebody flow control concept compilation - A Pilot's Associate application The appropriate concern for possible aberrations in about a full aircraft geometry p 920 A92-48220 landing guidance signals p 839 A92-44932 1AIAA PAPER 92-26781 p 799 A92-45530 Identifying design requirements using integrated analysis Autonomous landing - Functional requirements A LEX blowing technique for post-stall lateral control p 922 A92-48527 of trapezoidal wings [AIAA PAPER 92-2714] The importance of implicit and explicit knowledge in a LANDING GEAR pilot's associate system p 802 A92-45553 p 858 A92-48567 Sensitivity of tire response to variations in material and An experimental investigation of the effect of KNUDSEN FLOW p 900 A92-47128 geometric parameters leading-edge extensions on directional stability and the Low density heat transfer phenomena [AIAA PAPER 92-2899] p A failure analysis for landing gear structural system p 820 A92-47875 effectiveness of forebody nose strakes p 802 A92-45554 p 849 A92-47667 [AIAA PAPER 92-2715] KOLMOGOROFF THEORY Experimental investigation of vortex dynamics on delta LANDING SIMULATION Non-linear interactions in homogeneous turbulence with Simulation of triple simultaneous parallel ILS pproaches p 880 A92-45025 wings [AIAA PAPER 92-2731] and without background rotation p 912 N92-30044 p 804 A92-45565 KRYPTON FLUORIDE LASERS approaches Navier-Stokes computation of wing leading edge LAP JOINTS KrF laser-induced OH fluorescence imaging in a tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p.8 supersonic combustion tunnel Preliminary results on the fracture analysis of multi-site p 805 A92-45568 cracking of lap joints in aircraft skins [AIAA PAPER 92-3346] p 905 A92-48923 Prediction of leading-edge vortex breakdown on a delta o 913 N92-30111 wing oscillating in roll [AIAA PAPER 92-2677] Thermal QNDE detection of airframe disbonds p 807 A92-45585 p 914 N92-30118 Nonuniform motion of leading-edge vortex breakdown LASER ANEMOMETERS p 808 A92-45828 LABYRINTH SEALS on ramp pitching delta wings p 808 A92-45828 Experimental study of vortex flows over delta wings in LDA measurements in a Mach 2 flow over a rearward Development of high performance compressor facing step with staged transverse injection p 810 A92-46787 discharge seal wing-rock motion I AIAA PAPER 92-26921 p 800 A92-45539 [AIAA PAPER 92-3714] Pitch rate/sideslip effects on leading-edge extension p 907 A92-49096 Potential applications of laser Doppler anemometry for LAGRANGE COORDINATES vortices of an F/A-18 aircraft model in-flight measurements

p 859 N92-28654

p 827 N92-28658

p 830 N92-28980

Comparison of LDA and LTA applications for propeller

Laser anemometer measurements and computations in

an annular cascade of high turning core turbine vanes

INLR-TP-90163-UI

tests in wind tunnels

[NLR-MP-88031-U]

INASA-TP-32521

An Eulerian/Lagrangian method for computing

Prediction of laminar boundary layer using cubic

Gortler instability and supersonic quiet nozzle design

p 814 A92-46952

p 801 A92-45544

p 813 A92-46902

blade/vortex impingement
LAMINAR BOUNDARY LAYER

IAIAA PAPER 92-2702 I

splines

p 874 A92-46810

p 813 A92-46899

p 848 A92-47404

p 821 A92-47892

Multiple shock-shock interference on a cylindrical

Wing leading edge design with composites to meet bird

Heat transfer characteristics of hypersonic waveriders

with an emphasis on leading edge effects

leading edge

strike requirements

1AIAA PAPER 92-29201

		0
Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil	LINEAR QUADRATIC GAUSSIAN CONTROL Wideband control of gyro/accelerometer multisensors	Studies in general aviation aerodynamics [NASA-CR-190431] p 827 N92-28511
[AD-A247532] p 829 N92-28865	in a strapdown guidance system p 856 A92-46736	LOW COST
A method for computing the 3-dimensional flow about	Linear quadratic minimax controllers	Analytical design and demonstration of a low-cost
wings with leading-edge vortex separation. Part 2:	p 917 A92-46748	expendable turbine engine combustor
Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916	LINEAR SYSTEMS Parameter identification of linear systems based on	AIAA PAPER 92-3754 p 867 A92-49112 LOW DENSITY FLOW
LEAKAGE	smoothing p 873 A92-46742	Solution of the Burnett equations for hypersonic flows
Simple effective thickness model for circular brush	Robustness characteristics of fast-sampling digital PI	near the continuum limit
seals	controllers for high-performance aircraft with impaired	[AIAA PAPER 92-2922] p 821 A92-47894
[AIAA PAPER 92-3192] p 903 A92-48803 LEVITATION	control surfaces p 877 A92-48496 LIQUID COOLING	LOW REYNOLDS NUMBER Laminar separation bubbles and airfoil design at low
Superconducting bearings with levitation control	Liquid flow-through cooling for avionics applications	Reynolds numbers
configurations	p 902 A92-48448	[AIAA PAPER 92-2735] p 797 A92-45515
[NASA-CASE-GSC-13346-1] p 909 N92-29099	LIQUID FLOW	Unsteady aerodynamics of a Wortmann wing at low
LIAPUNOV FUNCTIONS Comparison of six robustness tests evaluating missile	High Reynolds number flows using liquid and gaseous	Reynolds numbers p 810 A92-46778 Grid sensitivity in low Reynolds number hypersonic
autopilot robustness to uncertain aerodynamics	helium ISBN 0-387-97475-X p 897 A92-45261	continuum flows p 817 A92-47057
p 873 A92-46737	Liquid flow-through cooling for avionics applications	LOW SPEED
LICENSING	p 902 A92-48448	Helicopter low-speed yaw control
Mandatory psychological testing of pilots as a requirement for ticensing in Norway?	LIQUID HELIUM	[NASA-CASE-LAR-14219-1] p 879 N92-30025 LOW SPEED WIND TUNNELS
p 835 A92-45081	High Reynolds number flows using liquid and gaseous helium	High-Reynolds-number test requirements in low-speed
LIFE (DURABILITY)	[ISBN 0-387-97475-X] p 897 A92-45261	aerodynamics p 787 A92-45263
A study on crack initiation method for durability	High-Reynolds-number test requirements in low-speed	A LEX blowing technique for post-stall lateral control
analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load	aerodynamics p 787 A92-45263 Water tunnels p 880 A92-45266	of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553
on the body of an aircraft p 848 A92-47664	Water tunnels p 880 A92-45266 LIQUID OXYGEN	An experimental investigation of the effect of
Economic life analysis for replacing components	Rotor support for the STME oxygen turbopump	leading-edge extensions on directional stability and the
p 785 A92-47670	[AIAA PAPER 92-3282] p 904 A92-48872	effectiveness of forebody nose strakes
The use of load enhancement factors in the certification	LIQUID PROPELLANT ROCKET ENGINES	[AIAA PAPER 92-2715] p 802 A92-45554 Flow quality studies of the NASA Lewis Research Center
of composite aircraft structures (NLR-TP-90068-U) p 852 N92-28649	Calculation methods on equivalence ratio of multi-propellant for propulsion system	8- by 6-foot supersonic/9- by 15-foot low speed wind
LIFE CYCLE COSTS	p 893 A92-48269	tunnel
VSTOL engine design evolution - Growth of the Pegasus	LIQUID ROCKET PROPELLANTS	[NASA-TM-105417] p 887 N92-28673
engine for Harrier p 860 A92-45306	Experimental investigation of liquid carbonhydrogen fuel	LUBRICANTS High temperature ministrative and turbine engine lubrication
Life cycle costs of the C-130 electrical power system upgrade	combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986	High-temperature miniaturized turbine engine lubrication system simulator
[AD-A246759] p 786 N92-28348	LOAD DISTRIBUTION (FORCES)	[AD-A249259] p 868 N92-28294
LIFT	A study on crack initiation method for durability	LUBRICATING OILS
In-flight simulation of backside operating models using	analysis p 901 A92-47663	Performance of hybrid ball bearings in oil and jet fuel
direct lift controller [SAE PAPER 912069] p 872 A92-45450	Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664	p 900 A92-47176 LUBRICATION
Dynamically enhanced sustained lift using oscillating	LOAD TESTING MACHINES	High-temperature miniaturized turbine engine lubrication
leading-edge flaps	Apparatus for elevated temperature compression or	system simulator
[AIAA PAPER 92-2625] p 794 A92-45497	tension testing of specimens	[AD-A249259] p 868 N92-28294
Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508	[NASA-CASE-LAR-14775-1] p 912 N92-30099	LUBRICATION SYSTEMS
	I DAD TESTS	High townstature ministrative and truthing angles behalvesting
A LEX blowing technique for post-stall lateral control	LOAD TESTS The use of load enhancement factors in the certification	High-temperature miniaturized turbine engine lubrication system simulator
A LEX blowing technique for post-stall lateral control of trapezoidal wings	The use of load enhancement factors in the certification of composite aircraft structures	High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649	system simulator
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels	system simulator [AD-A249259] p 868 N92-28294
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649	system simulator
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens	system simulator [AD-A249259] p 868 N92-28294
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099	system simulator [AD-A249259] p 868 N92-28294 M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS	system simulator [AD-A249259] p 868 N92-28294 M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099	system simulator [AD-A249259] p 868 N92-28294 M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] Propulsion system performance and integration for high
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES)	system simulator [AD-A249259] p 868 N92-28294 M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] Propulsion system performance and integration for high Mach air breathing flight Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46421
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES)	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] Propulsion system performance and integration for high Mach air breathing flight Waves and thermodynamics in high Mach number propulsive ducts Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind turnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link	system simulator [AD-A249259] M MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces panload optimization for minimum drag of multi-lifting-surface configurations	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 87 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] LIFT DRAG RATIO Experimental and numerical study of aerodynamic	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46919 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 Experimental and numerical study of aerodynamic characteristics for second generation SST	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47758 The airplane F-117 aircraft LONGITUDINAL CONTROL X-29 H-infinity controller synthesis	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations NLR-TP-89126-U p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft LONGITUDINAL CONTROL X-29 H-infinity controller synthesis	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47758 The airplane F-117 aircraft LONGITUDINAL CONTROL X-29 H-infinity controller synthesis	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations NLR-TP-89126-U p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 981 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-45504 LIFTING BODIES	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines for active control technology transport aircraft	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47758 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46915 Experimental investigation of the flowfield of an oscillating airfoil (NASA-TM-105675 p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations NLR-TP-89126-U p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632 p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines for active control technology transport aircraft	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46915 Experimental investigation of the flowfield of an oscillating airfoil (NASA-TM-105675 p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations NLR-TP-89126-U p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632 p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-4888 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COLLS Magnetic particle testing of turbine blades mounted on
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47100	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The Tonopah years p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718 LOSSES Examination of the main error factors with regards to	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COLLS Magnetic particle testing of turbine blades mounted on
A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47100 Aerodynamic performance of a full-scale lifting ejector	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-4888 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-464231 Calculation of the aerodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind turnnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632 p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47100 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-48488 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718 LOSSES Examination of the main error factors with regards to secondary losses in compression and turbine cascades by variations of the blade picture ratio [ETN-92-91493] p 871 N92-29927	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COLS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil (NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces panload optimization for minimum drag of multi-lifting-surface configurations (NLR-TP-89126-U) P 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056) p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47695 Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U]	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection AlAA PAPER 92-2692 p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces Constrained spanload optimization for minimum drag of multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056 p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity [AIAA PAPER 92-2632 p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47100 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-4888 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NR-TP-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] LOSSES Examination of the main error factors with regards to secondary losses in compression and turbine cascades by variations of the blade picture ratio [ETN-92-91493] LOW ALTITUDE Aerothemal ablation behavior of selected candidate	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COLS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODVNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil (NASA-TM-105675) p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces panload optimization for minimum drag of multi-lifting-surface configurations (NLR-TP-89126-U) p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056) p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity (AIAA PAPER 92-2632) p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47100 Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47100 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft AIAA PAPER 92-3094 p 824 A92-48738 In-flight simulation studies at the NASA Dryden Flight Research Facility (NASA-TM-4396) p 853 N92-29110	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U]	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996 Hypersonic plasma predictions at nonzero angle of
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces p 817 A92-47054 Constrained spanload optimization for minimum drag of multi-lifting-surface configurations NLR-TP-89126-U p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity AIAA PAPER 92-2632 p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47051 Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47100 Aerodynamic sensitivities for subsonic lifting-surface p 919 A92-47695 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft AIAA PAPER 92-3094 p 824 A92-48738 In-flight simulation studies at the NASA Dryden Flight Research Facility NASA-TM-4396 p 853 N92-29110 LIGHTNING	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] p 852 N92-28649 Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 LOADING OPERATIONS Enhancement of ground handling through optimum selection/use of Ground Support Equipment (GSE) [SAE PAPER 911973] p 881 A92-45380 LOADS (FORCES) Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 LOCAL AREA NETWORKS Airborne/shipborne PSK telemetry data link p 839 A92-47511 Identification of aerodynamic models for maneuvering aircraft [NASA-CR-190444] p 852 N92-28720 LOCKHEED AIRCRAFT Dawn of stealth p 785 A92-47757 The Tonopah years p 785 A92-47759 The airplane F-117 aircraft p 849 A92-47759 LONGITUDINAL CONTROL X-29 H-infinity controller synthesis p 873 A92-46749 Analysis of the VISTA longitudinal simulation capability for a cruise flight condition p 876 A92-4888 Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NRF-90129-U] p 878 N92-28652 LORAN C Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718 LOSSES Examination of the main error factors with regards to secondary losses in compression and turbine cascades by variations of the blade picture ratio [ETN-92-91493] LOW ALTITUDE Aerothemal ablation behavior of selected candidate external insulation materials [AIAA PAPER 92-3056] p 893 A92-48714	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996 Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028
A LEX blowing technique for post-stall lateral control of trapezoidal wings AIAA PAPER 92-2714 p 802 A92-45553 Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Optimum cruise lift coefficient in initial design of jet aircraft p 845 A92-46806 Wing design for hanggliders having minimum induced drag p 811 A92-46814 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 Experimental investigation of the flowfield of an oscillating airfoil (NASA-TM-105675) p 833 N92-30182 LIFT AUGMENTATION Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 LIFT DEVICES Single block mesh generation for a fuselage plus two lifting surfaces panload optimization for minimum drag of multi-lifting-surface configurations (NLR-TP-89126-U) p 828 N92-28660 LIFT DRAG RATIO Experimental and numerical study of aerodynamic characteristics for second generation SST SAE PAPER 912056) p 844 A92-45439 Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity (AIAA PAPER 92-2632) p 795 A92-45504 LIFTING BODIES Gridding strategies and associated results for winged entry vehicles p 918 A92-47100 Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47100 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft AIAA PAPER 92-3094 p 824 A92-48738 In-flight simulation studies at the NASA Dryden Flight Research Facility (NASA-TM-4396) p 853 N92-29110	The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U]	MACH NUMBER LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection AlAA PAPER 92-2692 p 800 A92-45539 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements [ETN-92-91492] p 833 N92-29889 MACHINE LEARNING An explanation-based-learning approach to knowledge compilation - A Pilot's Associate application p 920 A92-48220 MAGNETIC BEARINGS Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 Active magnetic bearings give systems a lift p 901 A92-48201 Superconducting bearings with levitation control configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 MAGNETIC COILS Magnetic particle testing of turbine blades mounted on the turbine rotor shaft p 898 A92-46498 MAGNETOHYDRODYNAMIC FLOW Laser velocimetry measurements in an MHD aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996 Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028

Expert systems for the trouble-shooting and the	MASS A general purpose nonlinear rigid body mass finite	METAL FATIGUE
diagnostics of engines [AIAA PAPER 92-3327] p 923 A92-48910	element for application to rotary wing dynamics	Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach
Flexible manufacturing in repair of gas turbine engine	p 846 A92-46924	p 897 A92-45242
components	MASS DISTRIBUTION	METAL MATRIX COMPOSITES
[AIAA PAPER 92-3524] p 786 A92-49049	Wing mass formula for subsonic aircraft	Axial alignment of short-fiber titanium aluminide
Turbine aircraft engine operational trending and JT8D	p 845 A92-46812 MASS FLOW	composites by directional solidification
static component reliability study IDOT/FAA/CT-91/101 p 870 N92-28686	Experimental study of cross-stream mixing in a	p 892 A92-46838 METAL PLATES
	rectangular duct	Aerodynamic characteristics of hoar frost roughness
Diffuser casing upgrade for an advanced turbofan NLR-TP-90097-U p 870 N92-28711	[AIAA PAPER 92-3090] p 903 A92-48735	p 808 A92-45829
A methodology for the evaluation of runway roughness	MATHEMATICAL MODELS	Surface residual stress analysis of metals and alloys
for repair	Selected models of aircraft navigation space p 839 A92-45373	[AD-A248372] p 895 N92-28426
[AD-A250407] p 887 N92-28772	Aircraft stabilization at large angles of attack	METALS
Design specifications for the Advanced Instructional	p 875 A92-47785	Surface residual stress analysis of metals and alloys
Design Advisor (AIDA), volume 2	Characterization of thermal performance of wheel	[AD-A248372] p 895 N92-28426
[AD-A248202] p 923 N92-29188	outboard of an aircraft p 849 A92-48352	MICROBURSTS (METEOROLOGY) Microburst modelling and scaling p 915 A92-46262
Repair procedures for advanced composites for helicopters	Location and tracking technique in a multistatic system	Thrust laws for microburst wind shear penetration
[MBB-UD-0606-91-PUB] p 787 N92-29874	established by multiple bistatic systems	p 873 A92-46750
Ageing airplane repair assessment program for Airbus	DYNamic Turbine Engine Compressor Code	MICROGRAVITY APPLICATIONS
A300 p 838 N92-30123	(DYNTECC) - Theory and capabilities	Demonstration of gas liquid separation under the
Communication: An important element of maintenance	[AIAA PAPER 92-3190] p 923 A92-48802	microgravity by aircraft KC-135
and repair p 838 N92-30124	Numerical investigation of surge and rotating stall in multistage axial compressors	SAE PAPER 912024 p 897 A92-45416
MAN ENVIRONMENT INTERACTIONS	AIAA PAPER 92-3193 p 825 A92-48804	MICROORGANISMS Microbiological spoilage of aviation turbine fuel. II -
Aircraft-triggered lightning - Processes following strike initiation that affect aircraft p 836 A92-46784	Calculation of unsteady transonic flows with mild	Evaluation of a suitable biocide p 891 A92-45600
MAN MACHINE SYSTEMS	separation by viscous-inviscid interaction	MICROSTRUCTURE
Specification of adaptive aiding systems - Information	[NASA-TP-3197] p 827 N92-28477	Investigation of the structural inhomogeneity of a
requirements for designers p 916 A92-44915	Inverse control problems: Mathematical preliminaries, system theoretical approaches, and their applications to	titanium alloy p 893 A92-47958
Mode S data link pilot-system interface - A blessing in	aircraft dynamics	MICROWAVE FREQUENCIES Bistatic scattering on a monostatic radar range
de skies or a beast of burden? p 839 A92-44920	[LR-665] p 923 N92-28581	p 849 A92-48408
Organizational factors in human factors accident	Experimental validation of a line-duct acoustics model	MICROWAVE IMAGERY
investigation p 834 A92-45000	including flow	Global and high resolution radar cross section
Knowledge-sensitive task manipulation - Acquiring knowledge from pilots flying a motion-based flight	[NLR-TP-90223-U] p 927 N92-28695 Calculation of support interferences on the aerodynamic	measurements and two-dimensional microwave images of
simulator pilots hying a motion-based hight	coefficients for a wind tunnel calibration model	a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877
Manual control of vehicles with time-varying dynamics	[ESA-TT-1247] p 830 N92-29159	MICROWAVE RADIOMETERS
[SAE PAPER 912078] p 917 A92-45454	Boundary layer induced noise in aircraft	Microwave temperature profiler for clear air turbulence
The role of simulation for the study of APIS (piloting	[CUED/A-AERO/TR-18] p 927 N92-29201	prediction
support by synthetic imagery) p 885 N92-28544	Development of a multigrid transonic potential flow code	[NASA-CASE-NPO-18115-1-CU] p 916 N92-29148
NARSIM: A real-time simulator for air traffic control	for cascades NASA-CR-190480 p 830 N92-29361	MILITARY AIR FACILITIES The Tonopah years p 785 A92-47758
research NLR-TP-90147-U p 888 N92-29204	Tear straps in airplane fuselage	A neural network based postattack damage assessment
MAN-COMPUTER INTERFACE	[AD-A248543] p 854 N92-29511	system p 922 A92-48520
Data Link integration in commercial transport	A semi empirical method for the analytical representation	MILITARY AIRCRAFT
operations p 839 A92-44919	of stationary measured profile coefficients for applications	International Powered Lift Conference, London,
Internationalization of telemetry systems p 920 A92-47535	of rotary wing aerodynamics	England, Aug, 29-31, 1990, Proceedings {ISBN 0-903409-68-2} p 783 A92-45302
Massinfo - An intelligent mass properties information	[ETN-92-91491] p 832 N92-29741	An overview of US Navy and Marine Corps V/STOL
system p 928 A92-47628	MATHEMATICAL PROGRAMMING Mathematical optimization: A powerful tool for aircraft	p 783 A92-45303
BUWICE - An interactive icing program applied to engine	design p 851 N92-28474	Current technology propulsion systems meet the STOVL
inlets	MATRIX METHODS	window of opportunity p 860 A92-45307
[AIAA PAPER 92-3179] p 922 A92-48794	Free vibration analysis of branched blades by the	MILITARY HELICOPTERS Advanced Rotorcraft Transmission program summary
MANAGEMENT Structural risk assessment in the Israel Air Force for	integrating matrix method p 847 A92-47122	[AIAA PAPER 92-3363] p 905 A92-48936
fleet management p 836 A92-46779	MAXIMUM LIKELIHOOD ESTIMATES	Boeing Helicopters Advanced Rotorcraft Transmission
MANAGEMENT INFORMATION SYSTEMS	Parameter identification of linear systems based on smoothing p 873 A92-46742	(ART) Program summary of component tests
Development of a flight information system using the	MCDONNELL AIRCRAFT	[AIAA PAPER 92-3364] p 905 A92-48937
structured method [AD-A248207] p 859 N92-29222	Fighter airframe/propulsion integration - A McDonnell	Advanced Rotorcraft Transmission (ART) - Component
•	Aircraft perspective	test results LAIAA PAPER 92-3366 L p 905 A92-48939
MANAGEMENT SYSTEMS	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916	[AIAA PAPER 92-3366] p 905 A92-48939
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts ρ 872 A92-45322	Aircraft perspective [AIAA PAPER 92:3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times	AIAA PAPER 92-3366 p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition p 927 N92-28923
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS)
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts P 872 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] P 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A27532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and potynomial classifier [DLR-FB-91-34] p 859 N92-29870	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts ρ 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics ρ 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] ρ 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment ρ 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier	AlAA PAPER 92-3366 p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition p 927 N92-28923
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-RB-91-34] p 859 N92-29870 MECHANICAL DRIVES	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and potynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-F8-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative
MANAGEMENT SYSTEMS Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A27532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MANUFACTURING Composites in manufacturing - Case studies	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite p 891 A92-45630 Advanced superalloys for turbine blade and vane applications	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3669] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil {AD-A247532} P 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MANUFACTURING Composites in manufacturing - Case studies [ISBN 0-87263-406-X-1] p 784 A92-47403	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [INASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MANUFACTURING Composites in manufacturing - Case studies [ISBN 0-87263-406-X] p 784 A92-47403 A manufacturer's approach to ensure long term	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite p 891 A92-45630 Advanced superalloys for turbine blade and vane applications	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers p 917 A92-46748 MINIMAX TECHNIQUE Linear quadratic minimax controllers Wing design for hanggliders having minimum induced
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil {AD-A247532} p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MANUFACTURING Composites in manufacturing - Case studies [ISBN 0-87263-406-X] p 784 A92-47403 A manufacturer's approach to ensure long term structural integrity p 838 N92-30133	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers
Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 MANEUVERABILITY Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794 Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil [AD-A247532] p 829 N92-28865 MANEUVERS The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 MANIPULATORS Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 MANNED SPACE FLIGHT Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 MANUAL CONTROL Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MANUFACTURING Composites in manufacturing - Case studies [ISBN 0-87263-406-X] p 784 A92-47403 A manufacturer's approach to ensure long term structural integrity p 838 N92-30133	Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MEASURING INSTRUMENTS A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644 Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel [NASA-TM-105417] p 887 N92-28673 Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-F8-91-34] p 859 N92-29870 MECHANICAL DRIVES An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 MECHANICAL ENGINEERING Repair procedures for advanced composites for helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874 MECHANICAL PROPERTIES Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite P 891 A92-45630 Advanced superalloys for turbine blade and vane applications [ONERA, TP NO. 1992-2] p 893 A92-48578 MEMORY (COMPUTERS) Global memory in the Pave Pace architecture	[AIAA PAPER 92-3366] p 905 A92-48939 Report on the workshop on lon Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923 MILITARY OPERATIONS The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Opportunities for flight simulation to improve operational effectiveness p 883 N92-28523 MIMD (COMPUTERS) Future directions in computing and CFD [AIAA PAPER 92-27341] p 917 A92-45489 MIMO (CONTROL SYSTEMS) Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 Compensating for manufacturing and life-cycle variations in aircraft engine control systems [AIAA PAPER 92-3869] p 868 A92-49139 MINIATURIZATION High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 MINIMAX TECHNIQUE Linear quadratic minimax controllers p 917 A92-46748 MINIMUM DRAG Wing design for hanggliders having minimum induced drag p 811 A92-46614

MISSILE CONFIGURATIONS MISSILE CONFIGURATIONS Parallel computing strategies for block multigrid implicit Computational evaluation of an airfoil with a Gurney p 812 A92-46894 Rapid synthesis for evaluating missile maneuverability solution of the Euler equations TAIAA PAPER 92-27081 p 802 A92-45550 parameters Patch-independent structured multiblock grids for CFD [AIAA PAPER 92-2615] p 873 A92-45488 computations p 919 A92-47078 MISSILE CONTROL boundary control airfoil Generation of unstructured grids within a hybrid IAIAA PAPER 92-27101 Wideband control of gyro/accelerometer multisensors p 818 A92-47090 multi-block environment p 856 A92-46736 in a strapdown guidance system MULTISENSOR APPLICATIONS Avionics software reusability observations around an airfoil with oscillating flap on dynamic grid An integrated navigation system manager using p 921 A92-48502 recommendations [AIAA PAPER 92-2733] federated Kalman filtering p 85
MULTIVARIATE STATISTICAL ANALYSIS p 858 A92-48477 MISSILE DESIGN Rapid synthesis for evaluating missile maneuverability tangential blowing for a tilt rotor in hover Full mission simulation: A view into the future parameters [AIAA PAPER 92-2615] p 884 N92-28537 p 873 A92-45488 MISSILE TRACKING at M = 3.5 and alpha = 18 deg N .~ER 92-2667 J Design considerations for a modern telemetry p 882 A92-47584 processing and display system hemisphere-cylinder at high incidences NACELLES Ablation performance characterization of thermal [AIAA PAPER 92-2712] Viscous flow past a nacelle isolated and in proximity of a flat plate protection materials using a Mach 4.4 Sled Test at large incidence I AIAA PAPER 92-30551 p 893 A92-48713 IAIAA PAPER 92-27231 p 803 A92-45560 Aerothermal ablation behavior of selected candidate Investigations of propulsion integration interference external insulation materials effects on a transport aircraft configuration including flexibility [AIAA PAPER 92-3056] p 893 A92-48714 I AIAA PAPER 92-30971 p 849 A92-48739 MIXING LAYERS (FLUIDS) NAP-OF-THE-EARTH NAVIGATION involving unstructured dynamic meshes Simultaneous imaging and interferometric turbule A high-performance LLLTV CCD camera for nighttime visualization in a high-velocity mixing/shear layer pilotage p 855 A92-46227 p 896 A92-45130 NASA PROGRAMS Supersonic jet mixing enhancement by 'delta-tabs' NASA Workshop on future directions in surface modeling results [AIAA PAPER 92-3548] p 826 A92-49063 and grid generation Experiments on the enhancement of compressible [NASA-CP-10092] p 831 N92-29625 transonic flows using the full Navier-Stokes equations mixing via streamwise vorticity. I - Optical measurements NATURAL LANGUAGE (COMPUTERS) [AIAA PAPER 92-3549] p 906 A92-49064 Internationalization of telemetry systems Effect of walls on the supersonic reacting mixing layer p 920 A92-47535 solver for helicopter rotor airloads in forward flight p 912 N92-30065 NAVIER-STOKES EQUATION Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 MIXING LENGTH FLOW THEORY Mixing and combustion effects in a sliding-wedge ram aerodynamic analysis accelerator with hydrogen injection Computational aerodynamics in aircraft design [AIAA PAPER 92-3251] p 890 A92-48849 Challenges and opportunities for Euler/Navier-Stokes svstems Turbulence modeling: Survey of activities in Belgium and methods the Netherlands, and appraisal of the status and a view [SAE PAPER 911990] p 788 A92-45392 computations Recent applications of the FNS zonal Method to complex on the prospects p 908 N92-28694 INLR-TP-90184-UT flow problems MOBILE COMMUNICATION SYSTEMS processes using the thin-layer Navier-Stokes equations ISAE PAPER 9120031 p 789 A92-45404 Gulf Range Drone Control Upgrade System Mobile Multidimensional Euler/Navier-Stokes analysis for Control System
MODAL RESPONSE p 882 A92-47567 hypersonic equilibrium gas [SAE PAPER 912026] compression corner flow p 790 A92-45418 IAIAA PAPER 92-29001 On the choice of appropriate bases for nonlinear Critical effects of downstream boundary conditions on p 847 A92-46927 dynamic modal analysis vortex breakdown Acoustic spinning-mode analysis by iterative threshold [AIAA PAPER 92-2601] p 792 A92-45478 near the continuum limit method applied to a helicopter turboshaft engine Effect of canard deflection [AIAA PAPER 92-2922] on close-coupled p 926 A92-48602 [ONERA, TP NO. 1992-41] p 92 Advances in aircraft modal identification canard-wing-body aerodynamics [AIAA PAPER 92-26021 n 792 A92-45479 sheared flow of an incompressible inviscid fluid ONERA, TP NO. 1992-47] p 877 A92-48608 Navier-Stokes and Euler solutions for an unmanned MODULARITY Modular avionics - A commercial perspective [AIAA PAPER 92-26091 p 792 A92-45483 p 858 A92-48427 Three-dimensional orthogonal-to-surface structured grid IAIAA PAPER 92-30411 generation with transonic Navier-Stokes flow solutions for MOLECULAR FLOW Low density heat transfer phenomena a commercial transport configuration on a turbine stator AIAA PAPER 92-2899) p 820 A92-47875 p 793 A92-45490 IAIAA PAPER 92-26161 [AIAA PAPER 92-3042] MOLECULAR RELAXATION Computational study of transition front on a swept wing The effect of molecular relaxation processes in air on leading-edge model transonic and supersonic flows in turbomachinery the rise time of sonic booms p 898 A92-45883 [AIAA PAPER 92-2630] p 795 A92-45502 [AIAA PAPER 92-3044] MONTE CARLO METHOD Unsteady Navier-Stokes simulations of supersonic flow FNS analysis of an axisymmetric scramjet inlet Comparison of six robustness tests evaluating missile over a three-dimensional cavity [AIAA PAPÉR 92-3100] autopilot robustness to uncertain aerodynamics [AIAA PAPER 92-2632] p 795 A92-45504 p 873 A92-46737 Application of an unstructured Navier-Stokes solver to Hypersonic rarefied flow about a delta wing - direct multi-element airfoils operating at transonic maneuver [AIAA PAPER 92-3102] simulation and comparison with experiment p 796 A92-45507 p 812 A92-46892 I AIAA PAPER 92-26381 A nonlinear relaxation/quasi-Newton algorithm for the Numerical and experimental investigation of rarefied compressible Navier-Stokes equations [AIAA PAPER 92-3259] compression corner flow [AIAA PAPER 92-2643] p 796 A92-45510 [AIAA PAPER 92-2900] p 820 A92-47876 Transonic airfoil and wing design using Navier-Stokes MOTION SIMULATION usina film coolina Knowledge-sensitive task manipulation - Acquiring [AIAA PAPER 92-3309] p 797 A92-45518 knowledge from pilots flying a motion-based I AIAA PAPER 92-26511 Effect of throat contouring on two-dimensional p 916 A92-45064 compressor stage using an algebraic Reynolds stress converging-diverging nozzles using URS method The basic research simulator programme and the [AIAA PAPER 92-2659] AIAA PAPER 92-2659] p 797 A92-45520 Numerical investigation of tail buffet on F-18 aircraft [AIAA PAPER 92-3311] industrial and aerospace community: Opportunities for cooperative research [AIAA PAPER 92-2673] p 798 A92-45528

p 887 N92-28579 ILR-6621

MOTION STABILITY

Oscillations of balloon-flight altitude

p 836 A92-46660

p 885 N92-28539

Symptom of payload-induced flight instability p 873 A92-46761

MOVING TARGET INDICATORS

IsoDoppler and mocomp corrections improve MTI p 898 A92-45774 radar

MRCA AIRCRAFT The evaluation of simulator effectiveness for the training

of high speed, low level, tactical flight operations

MULTIGRID METHODS

fast, implicit unstructured-mesh Euler method p 917 A92-45589 1AIAA PAPER 92-26931

Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct p 800 A92-45541 [AIAA PAPER 92-2699] Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced Navier-Stokes code [AIAA PAPER 92-2700] p 800 A92-45542 Commercial turbofan engine exhaust nozzle flow nalyses using PAB3D [AIAA PAPER 92-2701] p 801 A92-45543

Spatial and temporal adaptive procedures for the

unsteady aerodynamic analysis of airfoils using

p 799 A92-45531

p 800 A92-45540

IAD-A2492841

p 909 N92-28879

Calculation of high speed base flows [AIAA PAPER 92-2679] p

unstructured meshes

[AIAA PAPER 92-2694]

Compressible Navier-Stokes solutions for a suction p 802 A92-45551 Time accurate computation of unsteady transonic flows p 805 A92-45567 Navier-Stokes computation of wing leading edge p 805 A92-45568 [AIAA PAPER 92-2608] p 805 A92-45568 Comparison of the litux splitting schemes for calculation p 806 A92-45582 separation patterns and flow structures about a p 807 A92-45593 Navier-Stokes predictions for the F-18 wing and fuselage p 810 A92-46783 Navier-Stokes computations on swept-tapered wings, p 810 A92-46786 Temporal adaptive Euler/Navier-Stokes algorithm p 812 A92-46887 Joint computational/experimental aerodynamics research on hypersonic vehicle. II - Computational p 812 A92-46891 Numerical simulation of multizone two-dimensional p 815 A92-46955 Initial validation of an unsteady Euler/Navier-Stokes flow p 815 A92-46956 Grid adaptation to multiple functions for applied p 817 A92-47045 Simple diagnosis for the quality of generated grid p 919 A92-47069 Generation of efficient multiblock grids for Navier-Stokes p 919 A92-47081 Numerical experiments on unsteady shock reflection p 818 A92-47155 Numerical and experimental investigation of rarefied p 820 A92-47876 Solution of the Burnett equations for hypersonic flows p 821 A92-47894 Some exact and numerical results for plane steady p 821 A92-48019 Numerical computations of transonic flows through p 822 A92-48702 Comparison between two 3D-NS-codes and experiment p 822 A92-48703 A higher-order accurate Navier-Stokes solver for p 822 A92-48704 p 824 A92-48742 Computational analysis of ramjet engine inlet p 824 A92-48744 Prediction of a high bypass ratio engine exhaust nozzle p 864 A92-48855 Numerical simulation of turbine 'hot spot' alleviation p 904 A92-48896 Navier-Stokes investigation of a transonic centrifugal p 825 A92-48897 A Navier-Stokes analysis of a controlled-diffusion compressor cascade at increasing inlet-flow angles p 825 A92-48899 [AIAA PAPER 92-3313] Vane-blade interaction in a transonic turbine, II - Heat [AIAA PAPER 92-3324] p 904 A92-48907 A computational study of advanced exhaust system transition ducts with experimental validation [AIAA PAPER 92-3794] p 907 A92-49126 Viscous effects on a vortex wake in ground effect p 907 N92-28361 [NASA-CR-190400] Full Navier-Stokes analysis of a two-dimensional mixer/ejector nozzle for noise suppression p 868 N92-28419 [NASA-TM-105715] Explicit Navier-Stokes computation of turbomachinery

NAVIGATION AIDS	Jet aircraft noise at high subsonic flight Mach	NOSE TIPS
NAECON 91; Proceedings of the IEEE National Aerospace and Electronics Conference, Dayton, OH, May	numbers DLR-FB-91-28 p 928 N92-29997	Effect of a nose-boom on forebody vortex flow p 812 A92-46818
20-24, 1991. Vols. 1-3	NOISE SPECTRA	NOSES (FOREBODIES)
ISBN 0-7803-0084-X p 786 A92-48426 Rapid systems integration of navigation avionics	Sonic fatigue analysis and anti-sonic fatigue design of aircraft structure p 848 A92-47666	An experimental investigation of the effect of
p 858 A92-48473	Operational noise data for OH-58D Army helicopters	leading-edge extensions on directional stability and the effectiveness of forebody nose strakes
An integrated navigation system manager using	AD-A246822 p 926 N92-28292 NONDESTRUCTIVE TESTS	[AIAA PAPER 92-2715] p 802 A92-45554
federated Kalman filtering p 858 A92-48477 A new development in embedded computer	Magnetic particle testing of turbine blades mounted on	Decoupled predictions of radiative heating in air using
performance measurement p 921 A92-48506	the turbine rotor shaft p 898 A92-46498 Diffuser casing upgrade for an advanced turbofan	a particle simulation method [AIAA PAPER 92-2971] p 816 A92-46986
Loran-C performance assurance assessment program	[NLR-TP-90097-U] p 870 N92-28711	NOZZLE DESIGN
[NASA-CR-190469] p 840 N92-28718 NAVY	Computed Tomography (CT) as a nondestructive test	Effect of throat contouring on two-dimensional
US Navy revisits escape modules p 849 A92-47975	method used for composite helicopter components [MBB-UD-0603-91-PUB] p 910 N92-29873	converging-diverging nozzles using URS method [AIAA PAPER 92-2659] p 797 A92-45520
NEAR WAKES	Repair procedures for advanced composites for	Comparative investigation of multiplane thrust vectoring
LDV measurements in the three-dimensional near wake of a stationary and oscillating rectangular wind	helicopters [MBB-UD-0606-91-PUB] p 787 N92-29874	nozzles
[AIAA PAPER 92-2689] p 799 A92-45536	The 1991 International Conference on Aging Aircraft and	AIAA PAPER 92-3263 p 864 A92-48858 NOZZLE EFFICIENCY
NEURAL NETS	Structural Airworthiness [NASA-CP-3160] p 912 N92-30106	Experimental and analytical study of close-coupled
Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817	[NASA-CP-3160] p 912 N92-30106 Federal Aviation Administration aging aircraft	ventral nozzles for ASTOVL aircraft p 861 A92-45325
A neural network based postattack damage assessment	nondestructive inspection research plan	NOZZLE FLOW Oscillation of oblique shock waves generated in a two
system p 922 A92-48520	p 914 N92-30116 Inspection of aging aircraft: A manufacturer's	dimensional asymmetric nozzle
Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks	perspective p 914 N92-30117	[SAE PAPER 912061] p 791 A92-45443
[AIAA PAPER 92-3328] p 865 A92-48911	Thermal QNDE detection of airframe disbonds p 914 N92-30118	Commercial turbofan engine exhaust nozzle flow
NEWTON METHODS Multi-point inverse design of an infinite cascade of	NDE research efforts at the FAA Center for Aviation	analyses using PAB3D (AIAA PAPER 92-2701) p 801 A92-45543
airfoils	Systems Reliability p 914 N92-30119	The flip flop nozzle extended to supersonic flows
[AIAA PAPER 92-2650] p 797 A92-45517	Aging aircraft NDI Development and Demonstration Center (AANC): An overview nondestructive	[AIAA PAPER 92-2724] p 803 A92-45561
NICKEL ALLOYS Aluminides modified by palladium - Protection of new	inspection p 915 N92-30120	Prediction of a high bypass ratio engine exhaust nozzle flowfield
parts by local finishing	Nondestructive inspection perspectives	[AIAA PAPER 92-3259] p 864 A92-48855
[ONERA, TP NO. 1992-49] p 893 A92-48610	p 915 N92-30121 Current and future developments in civil aircraft	The enhancement of mixing in high-speed heated jets
Fatigue in single crystal nickel superalloys [AD-A248190] p 896 N92-29408	non-destructive evaluation from an operator's point of	using a counterflowing nozzle
[AD-A248190] p 896 N92-29408 NIGHT FLIGHTS (AIRCRAFT)	view p 787 N92-30122 Ageing airplane repair assessment program for Airbus	[AIAA PAPER 92-3262] p 825 A92-48857
A re-analysis of the causes of Boeing 727 'black hole	A300 p 838 N92-30123	A scramjet nozzle experiment with hypersonic external flow
landing' crashes p 833 A92-44985	Transport Canada aging aircraft activities	[AIAA PAPER 92-3289] p 864 A92-48878
A high-performance LLLTV CCD camera for nighttime pilotage p 855 A92-46227	p 838 N92-30131 NONEQUILIBRIUM CONDITIONS	Experimental validation of scramjet nozzle
NIGHT VISION	Analysis of thermo-chemical nonequilibrium models for	performance [AIAA PAPER 92-3290] p 864 A92-48879
A high-performance LLLTV CCD camera for nighttime	carbon dioxide flows	Investigation of three-dimensional flow field in a turbine
pilotage p 855 A92-46227 NITROGEN OXIDES	[AIAA PAPER 92-2852] p 892 A92-47835 NONEQUILIBRIUM FLOW	including rotor/stator interaction. II - Three-dimensional
A simplified reaction mechanism for prediction of NO(x)	Hypersonic plasma predictions at nonzero angle of	flow field at the exit of the nozzle
emissions in the combustion of hydrocarbons	attack [AIAA PAPER 92-3027] p 925 A92-47028	(AIAA PAPER 92-3326) p 826 A92-48909 NOZZLE GEOMETRY
[AIAA PAPER 92-3340] p 894 A92-48919 NOISE GENERATOR\$	Calculation of hypersonic, viscous, non-equilibrium flows	The effects of nozzle exit geometry on forebody vortex
Boundary layer induced noise in aircraft	around reentry bodies using a coupled boundary	control using blowing
[CUED/A-AERO/TR-18] p 927 N92-29201 NOISE INTENSITY	layer/Euler method [AIAA PAPER 92-2856] p 819 A92-47839	AIAA PAPER 92-2603 p 792 A92-45480
Operational noise data for OH-58D Army helicopters	Computation of hypersonic flowfields in thermal and	The flip flop nozzle extended to supersonic flows [AłAA PAPER 92-2724] p 803 A92-45561
[AD-A246822] p 926 N92-28292	chemical nonequilibrium [AIAA PAPER 92-2874] p 819 A92-47856	Taylor series approximation of geometric shape variation
NOISE MEASUREMENT New methods to determine the transmission loss of	Computation of 3-D hypersonic flows in chemical	for the Euler equations p 899 A92-46916
partitions using sound intensity measurements	non-equilibrium including transport phenomena	Ablative control mechanism in nozzle thermo-protection
p 924 A92-45879 Operational noise data for OH-58D Army helicopters	[AIAA PAPER 92-2876] p 820 A92-47858 Numerical simulation of chemical and thermal	[AIAA PAPER 92-3054] p 889 A92-48712
[AD-A246822] p 926 N92-28292	nonequilibrium flows behind compression shocks	A study on the impact of shroud geometry on ejector
NOISE POLLUTION	[AIAA PAPER 92-2879] p 820 A92-47860	pumping performance [AIAA PAPER 92-3260] p 864 A92-48856
Research and studies on quiet helicopters [ONERA, TP NO. 1992-59] p 926 A92-48618	Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows	Specifying exhaust nozzle contours in real-time using
NOISE PREDICTION (AIRCRAFT)	p 827 A92-49188	genetic algorithm trained neural networks
High-speed propeller noise prediction - A multidisciplinary approach p 924 A92-45831	NONLINEAR PROGRAMMING Integrated aeroservoelastic wing synthesis by nonlinear	{AIAA PAPER 92-3328 p 865 A92-48911 NOZZLE WALLS
multidisciplinary approach p 924 A92-45831 Noise of two high-speed model counter-rotation	programming/approximation concepts	Gortler instability and supersonic quiet nozzle design
propellers at takeoff/approach conditions	p 873 A92-46752	p 813 A92-46902
p 925 A92-46799 Basic experiments on the directivity of the sound	NONLINEAR SYSTEMS On the choice of appropriate bases for nonlinear	NUMERICAL CONTROL On-line performance evaluation of multiloop digital
radiation emitted by a turboshaft engine	dynamic modal analysis p 847 A92-46927	control systems p 873 A92-46739
[ONERA, TP NO. 1992-36] p 926 A92-48597	Nonlinear control design for slightly nonminimum phase systems - Application to V/STOL aircraft	Computer-Controlled Navigation System/General
Research and studies on quiet helicopters [ONERA, TP NO. 1992-59] p 926 A92-48618	p 876 A92-48160	Positioning System (CCNS/GPS) - A guidance, positioning, and management system for remote sensing flights
Jet aircraft noise at high subsonic flight Mach	Parameter identification for nonlinear aerodynamic	p 840 A92-47630
numbers	systems [NASA-CR-190264] p 830 N92-29329	Flexible manufacturing in repair of gas turbine engine
[DLR-F8-91-28] p 928 N92-29997 NOISE REDUCTION	NONLINEARITY	components
New methods to determine the transmission loss of	Nonlinear normal and axial force indicial responses for	AIAA PAPER 92-3524 p 786 A92-49049 NUMERICAL FLOW VISUALIZATION
partitions using sound intensity measurements p 924 A92-45879	a two dimensional airfoil [AD-A247196] p 830 N92-28888	Aerothermodynamics of a 1.6-meter-diameter sphere in
Solutions of acoustic field problems using parallel	Non-linear interactions in homogeneous turbulence with	hypersonic rarefied flow p 808 A92-45840
computers p 925 A92-45929	and without background rotation p 912 N92-30044	Mesh adaption for 2D transsonic Euler flows on unstructured meshes p 816 A92-47038
Gas turbine exhaust system silencing design p 882 A92-47365	Nonlinear analyses of composite aerospace structures in sonic fatigue	The construction, application and interpretation of
Research and studies on quiet helicopters	[NASA-CR-190565] p 854 N92-30209	three-dimensional hybrid meshes p 919 A92-47089
(ONERA, TP NO. 1992-59) p 926 A92-48618	NONUNIFORM FLOW Whirl-flutter stability of a pusher configuration in	Construction of a numerical optimization method for the definition of hypersupported profiles
Advanced Rotorcraft Transmission (ART) Program summary	nonuniform flow p 845 A92-46813	[ONERA-RSF-43/1736-AY-146A] p 908 N92-28788
[AIAA PAPER 92-3365] p 905 A92-48938	NORMAL SHOCK WAVES	Development of an unsteady three-dimensional
Full Navier-Stokes analysis of a two-dimensional mixer/ejector nozzle for noise suppression	Solution of the Burnett equations for hypersonic flows near the continuum limit	viscous-inviscid interaction numerical method for the calculation of airfoils vibration
[NASA-TM-105715] p 868 N92-28419	AIAA PAPER 92-2922 p 821 A92-47894	ONERA-RSF-7/3617-AY-022A p 830 N92-29206

001	IOHE	CHOCK	WAVEC
UBL	.IUUE	SHUCK	WAVES

Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443

Airfoil pressure measurements during oblique shock wave-vortex interaction in a Mach 3 stream

[AIAA PAPER 92-2631] p 795 A92-45503 OBSERVATION

Sensor fault detection on board an aircraft with observer and polynomial classifier

[DLR-FB-91-34] p 859 N92-29870 OGIVES

Alleviation of side force on tangent-ogive forebodies using passive porosity

[AIAA PAPER 92-2711] p 802 A92-45552 Comparison of two flux splitting schemes for calculation of ogive-cylinder at M = 3.5 and alpha = 18 deg

p 806 A92-45582 1AIAA PAPER 92-26671 OH-58 HELICOPTER

Frequency domain flight testing and analysis of an OH-58D helicopter H-58D helicopter p 847 Á92-46943 Operational noise data for OH-58D Army helicopters IAD-A246822] p 926 N92-28292

ONBOARD DATA PROCESSING

New Boeing flight test data acquisition systems

p 920 A92-47537 Airborne Data Acquisition and Relay System

p 839 A92-47574 ONBOARD EQUIPMENT

Potential applications of laser Doppler anemometry for -flight measurements

p 859 N92-28654 (NLŘ-TP-90163-U) Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718

OPERATING TEMPERATURE

Calculation of installation effects within performance p 869 N92-28465 omputer programs

OPERATOR PERFORMANCE

Perspective versus plan view air traffic control (ATC) displays - Survey and empirical results p 896 A92-44967

OPTICAL COMMUNICATION

Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244

OPTICAL FILTERS

Binary optical filters for scale invariant pattern ecognition

p 853 N92-28910 INASA-TM-1039021

OPTICAL GYROSCOPES

Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990 (SPIE-1367) p 901 A92-48026

OPTICAL MEASUREMENT

Experiments on the enhancement of compressible mixing via streamwise vorticity. I - Optical measurements [AIAA PAPER 92-3549] p 906 A92-49064

OPTICAL MEASURING INSTRUMENTS

The use of optical sensors and signal processing gas p 856 A92-46247 turbine engines Fiber optic and laser sensors VIII; Proceedings of the

Meeting, San Jose, CA, Sept. 17-19, 1990 p 901 A92-48026

Wavelength encoded fiber optic angular displacement p 857 A92-48046 Study of optical techniques for the Ames unitary wind

tunnels. Part 3: Angle of attack [NASA-CR-190541] p 888 N92-29655

OPTICAL PATHS

Multi-channel fiber optic rotary joint for single-mode

fiber

[AD-D015273] p 927 N92-29095

OPTICAL SCANNERS

Study of optical techniques for the Ames unitary wind tunnels. Part 3: Angle of attack

[NASA-CR-190541] p 888 N92-29655

OPTIMAL CONTROL

The method of determinant equations in the applied theory of optimal systems - Systems with 'rigid' constraints p 917 and with fixed boundary conditions A92-46629

Two variations of certainty control p 918 A92-46762 Magnetic bearing design and control optimization for a

p 900 A92-47188 four-stage centrifugal compressor Subsonic flight test evaluation of a performance seeking control algorithm on an F-15 airplane

p 878 A92-49109 I AIAA PAPER 92-3743 I Subsonic flight test evaluation of a propulsion system

parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 Feedback control laws for highly maneuverable

aircraft [NASA-CR-190535] p 879 N92-29654 OPTIMIZATION

The impact of CFD on the airplane design process -Today and tomorrow [SAE PAPER 911989] p 788 A92-45391

optimization Practical design wing/body configurations using the Euler equations p 795 A92-45505 [AIAA PAPER 92-2633]

Aerodynamic shape optimization of hypersonic configurations including viscous effects

[AIAA PAPER 92-2635] p 795 A92-45506 Minimizing supersonic wave drag with physical constraints at design and off-design Mach numbers

p 811 A92-46808 Wing design for hanggliders having minimum induced p 811 A92-46814

Optimization of constant altitude-constant airspeed flight of turbojet aircraft p 845 A92-46815

An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932

The optimization of variable cross-section spines with temperature dependent thermal parameters

p 901 A92-48353 Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane

p 866 A92-49111 [AIAA PAPER 92-3747] Integrated Design Analysis and Optimisation of Aircraft Structures

[AGARD-LS-186] p 851 N92-28469 Fundamentals of structural optimisation

p 851 N92-28470 Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an p 851 N92-28471 example p 851 N92-28472

Structural optimization of aircraft Multidisciplinary design and optimization IAGARD-PAPER-21 p 851 N92-28473

Mathematical optimization: A powerful tool for aircraft p 851 N92-28474 design Constrained spanload optimization for minimum drag of

multi-lifting-surface configurations [NLR-TP-89126-U] p 828 N92-28660 Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A]

n 908 N92-28788 Concurrent engineering in design of aircraft structures MBB-FE-2-S-PUB-472) p 854 N92-29650 Aerodynamic design optimization using sensitivity [MBB-FE-2-S-PUB-472] nalysis and computational fluid dynamics

INASA-CASE-LAR-14815-1-CU] p 910 N92-29830

OPTOELECTRONIC DEVICES

A new milestone in automatic aircraft control - Fly-by-light systems transmit commands optoelectronically p 784 A92-45699

Potential for integrated optical circuits in advanced aircraft with fiber optic control and monitoring systems

Fiber-optic position transducers for aircraft controls p 857 A92-48041 Multi-analog track fiber coupled position sensor

p 857 A92-48043 Fiber optic speed sensor for advanced gas turbine p 857 A92-48044 ngine control

Fiber-optic pressure sensor system for gas turbine p 857 A92-48047 p 857 engine control **ORBIT TRANSFER VEHICLES**

Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721

ORGANIC COMPOUNDS

Low VOC primer for structural bonding --- volatile organic p 892 A92-47338

bnuogmoo

ORR-SOMMERFELD EQUATIONS Numerical method for predicting transition in

three-dimensional flows by spatial amplification theory p 812 A92-46886

ORTHOGONALITY

Orthogonal grids for multiple airfoils p 818 A92-47096

OSCILLATING FLOW

Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle

ISAE PAPER 9120611 p 791 A92-45443 The flip flop nozzle extended to supersonic flows p 803 A92-45561 [AIAA PAPER 92-2724] Numerical solutions of unsteady oscillating flows past

an airfoil p 825 A92-48817 [AIAA PAPER 92-3212] Experimental investigation of the flowfield of an oscillating airfoil

p 833 N92-30182 INASA-TM-1056751

OSCILLATIONS

Prediction of dynamic hub load of a rotor executing multiple sinusoidal blade pitch variations

p 846 A92-46921

OUTLET FLOW

using Duhamet's p 813 A92-46913 Outflow boundary conditions equation

OZONE

A preliminary design and analysis of an advanced heat-rejection system for an extreme altitude advanced variable cycle diesel engine installed in a high-altitude advanced research platform INASA-CR-1860211 p 871 N92-29427

PACKET TRANSMISSION

24-bit flight test data recording format

p 900 A92-47528

Paint removal using cryogenic processes

IAD-A2476681 p 895 N92-28912

PALLADIUM ALLOYS

Aluminides modified by palladium - Protection of new parts by local finishing p 893 . A92-48610

ONERA, TP NO. 1992-491 PANEL METHOD (FLUID DYNAMICS)

Free wake analyses of a hovering rotor using panel method [SAE PAPER 912004] p 789 A92-45405

Aerodynamic characteristics near the tip of a finite wing by a panel method ISAE PAPER 9120201

p 790 A92-45413 Thin-airfoil correction for panel methods

p 811 A92-46811 Calculation of unsteady subsonic and supersonic flow about oscillating wings and bodies by new panel methods

INLR-TP-89119-U1 n 827 N92-28659 Hyperbolic grid generation control by panel methods p 924 N92-29604 [NLR-TP-91061-U] A method for computing the 3-dimensional flow about

vings with leading-edge vortex separation. Part 2: Description of computer program VORSEP INLR-TR-86006-U1 p 833 N92-29916

PANELS Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406

Combined load test apparatus for flat panels p 911 N92-30028

[NASA-CASE-LAR-14698-1]

PARALLEL COMPUTERS Solutions of acoustic field problems using parallel

computers p 925 A92-45929

PARALLEL PROCESSING (COMPUTERS)

Future directions in computing and CFD [AIAA PAPER 92-2734] p 917 A92-45489 Parallel computing strategies for block multigrid implicit p 812 A92-46894

solution of the Euler equations
PARAMETER IDENTIFICATION

Spaceplane longitudinal aerodynamic parameter estimation by cable-mount dynamic wind-tunnel test [SAE PAPER 911980] p 788 A92-4 p 788 A92-45385 Parameter identification of linear systems based on

moothing p 873 A92-46742 Aerodynamic parametric studies and sensitivity analysis smoothing for rotor blades in axial flight p 816 A92-46959 Subsonic flight test evaluation of a propulsion system

parameter estimation process for the F100 engine . [AIAA PAPER 92-3745] p 866 A92-49110 Parameter identification for nonlinear aerodynamic

systems [NASA-CR-190264] p 830 N92-29329

PARAMETERIZATION

Fundamentals of structural optimisation

p 851 N92-28470 Ageing airplane repair assessment program for Airbus p 838 N92-30123

PASSENGER AIRCRAFT

Aviation, motor, and space designs --- research and development in U.S.S.R. p 784 A92-46202 Mathematical modeling of the flight of passenger aircraft in the case of engine failure p 875 A92-47777 Aging commuter aeroplanes: Fatigue evaluation and control methods p 915 N92-30132

PATTERN RECOGNITION

Binary optical filters for scale invariant pattern recognition p 853 N92-28910

[NASA-TM-103902] PAVEMENTS

A methodology for the evaluation of runway roughness for repair

[AD-A250407] p 887 N92-28772 PAYLOADS

Symptom of payload-induced flight instability

p 873 A92-46761

PCM TELEMETRY

Real time presentation for RAFALE in-flight tests p 882 A92-47522

p 900 A92-47528	p 835 A92-45055	Thermal response of rigid and flexible insulations and
Modern techniques for monitoring airborne telemetry	PILOT PERFORMANCE	reflective coating in an aeroconvective heating
p 857 A92-47560	The standardization of military head-up display	environment
Remote telemetry concepts p 882 A92-47562	symbology p 855 A92-44929	[NASA-TM-103925] p 852 N92-28721
Design considerations for a modern telemetry	Toward an integrated multimodal approach to flight simulation p 880 A92-45026	PLASTIC AIRCRAFT STRUCTURES
processing and display system p 882 A92-47584 PERFORMANCE	Getting test items to measure knowledge at the level	Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430
The design of test-section inserts for higher speed	of complexity which licensing authorities desire - Another	Finite elements analysis of flexural edge wave for
aeroacoustic testing in the Ames 80- by 120-foot wind	dimension to test validity p 835 A92-45080	composite fan blades
tunnel	The importance of implicit and explicit knowledge in a	[SAE PAPER 912048] p 861 A92-45432
[NASA-TM-103915] p 927 N92-28909	pilot's associate system p 858 A92-48567	Structural concept of main wings of high altitude
PERFORMANCE PREDICTION	Use of a commercially available flight simulator during	unmanned aerial vehicle and basic properties of
An experimental investigation on aft bypass supersonic	aircrew performance testing [AD-A245922] p 883 N92-28407	thermoplastic composites as candidate material
inlet performance at high angle of attack and yaw p 862 A92-48268	PILOT SELECTION	[SAE PAPER 912053] p 843 A92-45437
Characterization of thermal performance of wheel	Mandatory psychological testing of pilots as a	Fabrication and mechanical properties of an optically
outboard of an aircraft p 849 A92-48352	requirement for ticensing in Norway?	transparent glass fiber/polymer matrix composite
The effect of tip convection on the performance and	p 835 A92-45081	p 891 A92-45630
optimum dimensions of cooling fins p 902 A92-48354	PILOT TRAINING	The use of load enhancement factors in the certification of composite aircraft structures
Systems simulation of an advanced avionics COMSEC	Stop, look and learn from accident investigation p 834 A92-44996	[NLR-TP-90068-U] p 852 N92-28649
unit p 921 A92-48485 Steady and Transient Performance Prediction of Gas	The effectiveness of training programs for preventing	PLATES (STRUCTURAL MEMBERS)
Turbine Engines	aircrew 'error' p 834 A92-44997	Nonlinear analyses of composite aerospace structures
[AGARD-LS-183] p 868 N92-28458	Centre for Flight Simulation Berlin Airbus 340 simulator	in sonic fatigue
Overview on basis and use of performance prediction	for research and training p 880 A92-45028	[NASA-CR-190565] p 854 N92-30209
methods p 869 N92-28459	A training program for airline line instructors	PNEUMATIC CIRCUITS
Steady and transient performance calculation method	p 835 A92-45044	A simple and low cost system to measure delay times
for prediction, analysis, and identification	Judgement training for Alaskan pilots p 835 A92-45048	in pneumatic systems [NLR-TP-90174-U] p 859 N92-28644
p 869 N92-28461 Component performance requirements	Use of a commercially available flight simulator during	PNEUMATIC CONTROL
p 869 N92-28462	aircrew performance testing	Analysis of a pneumatic forebody flow control concept
Dynamic simulation of compressor and gas turbine	[AD-A245922] p 883 N92-28407	about a full aircraft geometry
performance p 869 N92-28463	Piloted Simulation Effectiveness	[AIAA PAPER 92-2678] p 799 A92-45530
Calculation of installation effects within performance	[AGARD-CP-513] p 786 N92-28522	Effects of bleed air extraction on thrust levels on the
computer programs p 869 N92-28465	Opportunities for flight simulation to improve operational	F404-GE-400 turbofan engine
PERFORMANCE TESTS	effectiveness p 883 N92-28523 Utility of ground simulation in flight control problem	[NASA-TM-104247] p 871 N92-29425
Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176	identification, solution development, and verification	PNEUMATIC EQUIPMENT Advanced pneumatic impulse ice protection system
Construction of a real-time DGPS experimental system	p 883 N92-28525	(PIIP) for aircraft p 845 A92-46807
p 840 A92-47631	Experience with piloted simulation in the development	POINT SOURCES
Robust discrete controller design for an unmanned	of helicopters p 884 N92-28528	Discrete modes and continuous spectra in supersonic
research vehicle (URV) using discrete quantitative	Harrier GR MK 5/7 mission simulators for the Royal	boundary layers p 809 A92-46264
feedback theory p 877 A92-48495	Air Force p 885 N92-28540	POLARIZATION (WAVES)
A study on the impact of shroud geometry on ejector	Experience with piloted simulation in the development of helicopters	Global and high resolution radar cross section
pumping performance [AIAA PAPER 92-3260] . p 864 A92-48856	[MBB-UD-0610-91-PUB] p 889 N92-30076	measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310
Experimental validation of scramjet nozzle	PILOTLESS AIRCRAFT	[DLR-MITT-91-10] p 911 N92-29877
performance	Navier-Stokes and Euler solutions for an unmanned	POLICIES
[AIAA PAPER 92-3290] p 864 A92-48879	aerial vehicle	The FAA aging airplane program plan for transport
Internal reversing flow in a tailpipe offtake configuration	[AIAA PAPER 92-2609] p 792 A92-45483	aircraft p 838 N92-30128
for SSTOVL aircraft	Airborne Data Acquisition and Relay System	POLLUTION CONTROL
[NASA-TM-105698] p 868 N92-28418	p 839 A92-47574 Robust discrete controller design for an unmanned	Low VOC primer for structural bonding volatile organic
LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687	research vehicle (URV) using discrete quantitative	compound p 892 A92-47338 Non-chromated anodize process for corrosion
Tasking and communication flows in the F/A-18D	feedback theory p 877 A92-48495	resistance and adhesive bonding p 892 A92-47341
cockpit: Issues, problems, and possible solutions	Emerging technologies for gas turbine engines - U.A.V.	Applied analytical combustion/emissions research at the
[AD-A245977] p 853 N92-28802	synergies	NASA Lewis Research Center
A comparison of the calculated and experimental	[AIAA PAPER 92-3757] p 867 A92-49114	[NASA-TM-105731] p 890 N92-29343
off-design performance of a radial flow turbine	PISTON ENGINES	POLYMER MATRIX COMPOSITES
[NASA-CR-189207] p 831 N92-29402 PERIODIC VARIATIONS	Study of grinding process and strength for ceramic heat insulated engine	Fabrication and mechanical properties of an optically
Effect of model cooling on periodic transonic flow	[SME PAPER MR91-177] p 897 A92-45260	transparent glass fiber/polymer matrix composite p 891 A92-45630
p 813 A92-46900	Restart of theory of air-breathing engines	POLYNOMIALS
Production of periodical Mach number variations in high	[AIAA PAPER 92-3472] p 906 A92-49018	Compact higher order characteristic-based Euler solver
subsonic flow in a blow down wind tunnel, and its influence	PITCH (INCLINATION)	for unstructured grids p 812 A92-46889
on profile measurements	Measurements of the velocity and vorticity fields around	Sensor fault detection on board an aircraft with observer
[ETN-92-91492] p 833 N92-29889	a pitching airfoil [AIAA PAPER 92-2626] p 794 A92-45498	and polynomial classifier
PERIPHERAL EQUIPMENT (COMPUTERS) Upgrading the data processing section of the NAL Gust	Unsteady crossflow on a delta wing using particle image	[DLR-FB-91-34] p 859 N92-29870 POROSITY
Wind Tunnel data processing system	velocimetry p 811 A92-46804	Alleviation of side force on tangent-ogive forebodies
[NAL-TM-635] p 888 N92-28833	Pitch rate/sideslip effects on leading-edge extension	using passive porosity
PERSONAL COMPUTERS	vortices of an F/A-18 aircraft model	[AIAA PAPER 92-2711] p 802 A92-45552
Ferroelectric memory evaluation and development	p 874 A92-46810	POROUS WALLS
system p 902 A92-48460	Prediction of dynamic hub load of a rotor executing	Static and dynamic flow field development about a
PERSONNEL	multiple sinusoidal blade pitch variations	porous suction surface wing
NASA engineers and the age of Apollo [NASA-SP-4104] p 929 N92-28344	Flow visualisation of a small diameter rotor operating	[AIAA PAPER 92-2628] p 795 A92-45500 POSITION INDICATORS
PHASE ERROR	at high rotational speeds with blades at small pitch	Study of optical techniques for the Ames unitary wind
Motion errors in an airborne synthetic aperture radar	angles p 814 A92-46949	tunnels. Part 3: Angle of attack
system p 840 A92-48416	Stability and control flight testing of a half-scale Pioneer	[NASA-CR-190541] p 888 N92-29655
PHASE SEPARATION (MATERIALS)	remotely piloted vehicle	POSITION SENSING
Demonstration of gas liquid separation under the	[AD-A245973] p 879 N92-28801	Fibre optic rotary position sensors for vehicle and
microgravity by aircraft KC-135	Nonlinear normal and axial force indicial responses for a two dimensional airfoil	propulsion controls p 855 A92-46243
[SAE PAPER 912024] p 897 A92-45416	[AD-A247196] p 830 N92-28888	Fiber-optic position transducers for aircraft controls
PHOTODIODES Study of optical techniques for the Ames unitary wind	PITCHING MOMENTS	p 857 A92-48041 Application of analog fiber optic position sensors to flight
tunnels. Part 3: Angle of attack	Aircraft spoiler effects under wind shear	control systems p 857 A92-48042
[NASA-CR-190541] p 888 N92-29655	[AIAA PAPER 92-2642] p 796 A92-45509	Multi-analog track fiber coupled position sensor
PILOT ERROR	PIVOTS	p 857 A92-48043
The effectiveness of training programs for preventing	Reduction and analysis of F-111C flight data	POTENTIAL FLOW
aircrew 'error' p 834 A92-44997	[AD-A250341] p 853 N92-28771	Calculation of potential flow around airfoils using a
Eliminating pilot-caused altitude deviations - A human		
	PLANFORMS Determination of paradynamic conditivity coefficients	discrete vortex method p 808 A92-45827
factors approach p 834 A92-45041 Rejected takeoffs - Causes problems and	Determination of aerodynamic sensitivity coefficients	A new integral equation for potential compressible
factors approach p 834 A92-45041 Rejected takeoffs - Causes, problems, and consequences p 835 A92-45052		

Viscous effects on a vortex wake in ground effect PROPELLANT ADDITIVES Unsteady pressure and load measurements on an [NASA-CR-190400] p 907 N92-28361 F/A-18 vertical fin at high-angle-of-attack Microbiological spoilage of aviation turbine fuel. II p 798 A92-45529 Wave drag determination in the transonic full-potential I AIAA PAPER 92-2675 I Evaluation of a suitable biocide p 891 A92-45600 flow code MATRICS Study of the leading-edge vortex dynamics in the Enhancing the performance characteristics of engine [NLR-TP-90062-U] p 828 N92-28709 unsteady flow over an airfoil fuels by means of surfactant additives Development of a multigrid transonic potential flow code I AD-A247532 I p 829 N92-28865 p 892 A92-46631 PROPELLANT PROPERTIES PRESSURE BATIO for cascades [NASA-CR-190480] Enhancing the performance characteristics of engine p 830 N92-29361 Turboshaft/turboprop cycle sensitivity analysis [AIAA PAPER 92-3476] POWER EFFICIENCY p 865 A92-49020 fuels by means of surfactant additives Energy analysis of high-speed flight systems p 892 A92-46631 PRESSURE REDUCTION PROPELLER BLADES p 925 A92-46430 Spectrogram diagnosis of aircraft disasters POWERED LIFT AIRCRAFT [SAE PAPER 912041] p 836 A92-45425 Whirl-flutter stability of a pusher configuration in Harrier international programme p 841 A92-45305 An experimental investigation of high-aspect-ratio nonuniform flow p 845 A92-46813 VSTOL engine design evolution - Growth of the Pegasus PROPELLER NOISE cooling passages engine for Harrier noise p 860 A92-45306 High-speed propeller prediction I AIAA PAPER 92-31541 p 890 A92-48780 multidisciplinary approach A USAF assessment of STOVL fighter options p 924 A92-45831 Effects of bleed air extraction on thrust levels on the F404-GE-400 turbofan engine p 842 A92-45310 Evolution of ASTOVL aircraft design Comparison of LDA and LTA applications for propeller INASA-TM-1042471 p 871 N92-29425 p 842 A92-45311 PRESSURE SENSORS tests in wind tunnels Internal reversing flow in a tailpipe offtake configuration Fiber-optic pressure sensor system for gas turbine ngine control p 857 A92-48047 INLR-MP-88031-UI p 827 N92-28658 for SSTOVI aircraft PROPORTIONAL CONTROL Robustness characteristics of fast-sampling digital PI p 868 N92-28418 INASA-TM-1056981 Absolute fiber optic pressure transducer for aircraft air Aerodynamic characteristics obtained from alpha sweep controllers for high-performance aircraft with impaired data measurement n 858 A92-48501 test of the quiet STOL experimental aircraft ASKA PRESSURE VESSELS control surfaces D 877 A92-48496 PROPULSION SYSTEM CONFIGURATIONS p 853 N92-28901 (NAL-TR-1112) Replacement of the NAL high pressure air storage POWERED MODELS Current technology propulsion systems meet the STOVL system A Mach-scaled powered model for rotor-fuselage [NAL-TM-634] window of opportunity p 860 A92-45307 p 888 N92-28835 flight mechanics ASTOVL propulsion systems configuration and concept interactional aerodynamics and PRESSURIZED CABINS A92-46960 investigations p 847 p 842 A92-45312 Aerospace pressurization system design PREBURNERS [SAE AIR 1168/7] p 849 A92-48022 ASTOVL engine control p 860 A92-45321 Fiber optic controls for aircraft engines - Issues and Analysis of a hydrocarbon scramjet with augmented PRIMERS (COATINGS) p 856 A92-46244 Low VOC primer for structural bonding --- volatile organic preburning p 865 A92-48984 p 892 A92-47338 AIAA PAPER 92-34251 High speed rotorcraft propulsion concepts to control compound PRECIPITATION (METEOROLOGY) power/speed characteristics Anodize and prime your aluminum without environmental Microburst modelling and scaling AIAA PAPER 92-3367 p 865 A92-48940 p 892 A92-47340 headaches PREDICTION ANALYSIS TECHNIQUES PROBABILITY DENSITY FUNCTIONS A new vane swirler as applied to dual-inlet side-dump Advances in fatigue lifetime predictive techniques: Improved method for estimation of the maximum combustor Proceedings of the Symposium, San Francisco, CA, Apr. [AIAA PAPER 92-3654] p 906 A92-49085 instantaneous distortion values 24, 1990 The External Propulsion Accelerator - Scramjet thrust [AIAA PAPER 92-3623] p 826 A92-49076 without interaction with accelerator barrel [ASTM STP-1122] p 896 A92-45226 Modeling of the reactant conversion rate in a turbulent Steady and Transient Performance Prediction of Gas [AIAA PAPER 92-3717] p 866 A92-49098 p 829 N92-28820 shear flow Turbine Engines PROBABILITY THEORY A preliminary design and analysis of an advanced p 868 N92-28458 heat-rejection system for an extreme altitude advanced I AGARD-LS-1831 Probability analysis of structure failure for the wings with main and subordinate components p 848 A92-47657 variable cycle diesel engine installed in a high-altitude Overview on basis and use of performance prediction methods n 869 N92-28459 Approximate analysis for failure probability of structural advanced research platform [NASA-CR-186021] p 871 N92-29427 Engine performance and health monitoring models using n 901 A92-47671 Flight evaluation of an extended engine life mode on steady state and transient prediction methods PROCESS CONTROL (INDUSTRY) Integrated wiring system (SAE PAPER 912058) p 870 N92-28467 an F-15 airolane INASA-TM-1042401 p 871 N92-29659 Experimental and computational ice shapes and p 897 A92-45440 PROPULSION SYSTEM PERFORMANCE resulting drag increase for a NACA 0012 airfoil PRODUCT DEVELOPMENT p 828 N92-28674 Airbus A319 - Completion of the standard fuselage ASTOVL flexibility in the 21st century (NASA-TM-105743) p 783 A92-45309 p 848 A92-47591 Fracture mechanics research at NASA related to the family High-speed flight propulsion systems --- Book German-GUS cooperation in civil aviation aging commercial transport fleet p 913 N92-30110 p 785 A92-47592 p 862 A92-46426 **PREDICTIONS** Introduction --- propulsion system performance for Dawn of stealth p 785 A92-47757 Microwave temperature profiler for clear air turbulence An eight month gearbox developm hypersonic vehicles p 862 A92-46427 ent program p 850 A92-48941 1AIAA PAPER 92-33681 Propulsion system performance and integration for high INASA-CASE-NPO-18115-1-CUI p 916 N92-29148 Piloted Simulation Effectiveness Mach air breathing flight p 862 A92-46429 PREDICTOR-CORRECTOR METHODS (AGARD-CP-513) p 786 N92-28522 Energy analysis of high-speed flight systems An improved approach for the computation of Flight simulation and digital flight controls transonic/supersonic flows with applications to aerospace p 925 A92-46430 p 884 N92-28526 Calculation methods on equivalence ratio of configurations The application of flight simulation models in support [AIAA PAPER 92-2613] p 793 A92-45487 multi-propellant for propulsion system of rotorcraft design and development p 893 A92-48269 Enhancements to viscous-shock-layer technique p 884 N92-28527 [AIAA PAPER 92-2897] p 820 A92-47873 Prediction of a high bypass ratio engine exhaust nozzle Experience with piloted simulation in the development PRESSURE DISTRIBUTION p 884 N92-28528 of heliconters [AIAA PAPER 92-3259] p 864 A92-48855 Scale effects on the flow past the mated Space Shuttle PRODUCTIVITY High speed rotorcraft propulsion concepts to control Improving designer productivity --- artificial intelligence
(NASA-TM-103929) p.854 N92-29417 configuration power/speed characteristics [AIAA PAPER 92-2680] p 799 A92-45532 [AIAA PAPER 92-3367] Alleviation of side force on tangent-ogive forebodies PROGRAM VERIFICATION (COMPUTERS) p 865 A92-48940 Design issues in a fiber optic sensor system architecture using passive porosity Verification and validation of F-15 and S/MTD unique [AIAA PAPER 92-2711] p 802 A92-45552 for aircraft engine control software p 921 A92-48515 [AIAA PAPER 92-3483] Experimental investigation of vortex dynamics on delta PROGRAMMING LANGUAGES p 866 A92-49023 Development of a flight information system using the Subsonic flight test evaluation of a performance seeking [AIAA PAPER 92-2731] p 804 A92-45565 structured method control algorithm on an F-15 airplane p 878 A92-49109 p 859 N92-29222 [AIAA PAPER 92-3743] An unstructured approach to the design of multiple-element airfoils PROJECT MANAGEMENT Subsonic flight test evaluation of a propulsion system An eight month gearbox development program p 807 A92-45592 parameter estimation process for the F100 engine [AIAA PAPER 92-2709] [AIAA PAPER 92-3368] p 850 A92-48941 [AIAA PAPER 92-3745] Separation patterns and flow structures about a p 866 A92-49110 PROJECT PLANNING Thrust stand evaluation of engine performance hemisphere-cylinder at high incidences The FAA aging airplane program plan for transport [AIAA PAPER 92-2712] p 807 A92-45593 improvement algorithms in an F-15 airplane p 866 A92-49111 Separated high enthalpy dissociated laminar hypersonic [AIAA PAPER 92-3747] PROP-FAN TECHNOLOGY Analytical design and demonstration of a low-cost flow behind a step - Pressure measurements Predicted pressure distribution on a prop-fan blade p 809 A92-45858 expendable turbine engine combustor through Euler analysis p 810 A92-46791 [AIAA PAPER 92-3754] p 867 A92-49112 Calculation of installation effects within performance German-GUS cooperation in civil aviation p 869 N92-28465 Component performance requirements computer programs p 785 A92-47592 p 869 N92-28462 Combined load test apparatus for flat panels Numerical flow simulation and analysis of a shrouded p 911 N92-30028 [NASA-CASE-LAR-14698-1] Inlet distortion effects in aircraft propulsion system propfan rotor p 869 N92-28464 PRESSURE MEASUREMENT [AIAA PAPER 92-3773] integration p 826 A92-49118 Static and dynamic flow field development about a PROPAGATION MODES Engine performance and health monitoring models using porous suction surface wing steady state and transient prediction methods Three-dimensional-mode resonance in far wakes I AIAA PAPER 92-2628 I p 795 A92-45500 p 898 A92-46252 p 870 N92-28467 Experimental validation of a line-duct acoustics model Airfoil pressure measurements during oblique shock Flight evaluation of an extended engine life mode on

including flow INLR-TP-90223-U | an F-15 airplane

[NASA-TM-104240]

p 871 N92-29659

p 927 N92-28695

wave-vortex interaction in a Mach 3 stream

p 795 A92-45503

[AIAA PAPER 92-2631]

RECTANGULAR WINGS SUBJECT INDEX

SUBJECT INDEX		HECTANGULAR WINGS
PROTECTIVE COATINGS	RADIANT COOLING	Numerical and experimental investigation of rarefied
Low VOC primer for structural bonding volatile organic	Effect of model cooling on periodic transonic flow	compression corner flow
compound p 892 A92-47338	p 813 A92-46900	[AIAA PAPER 92-2900] p 820 A92-47876
Aluminides modified by palladium - Protection of new	Analytical and experimental studies of heat pipe radiation	RATINGS
parts by local finishing	cooling of hypersonic propulsion systems [AIAA PAPER 92-3809] p 867 A92-49128	Assessment of army aviators' ability to perform individual
ONERA, TP NO. 1992-49] p 893 A92-48610 Ablation performance characterization of thermal	Hypersonic flow past radiation-cooled surfaces	and collective tasks in the aviation networked simulator [AD-A250293] p 888 N92-29709
protection materials using a Mach 4.4 Sled Test	[MBB-FE-202-S-PUB-0468-A] p 832 N92-29713	RAYLEIGH SCATTERING
[AIAA PAPER 92-3055] p 893 A92-48713	RADIATION DISTRIBUTION	Shock enhancement and control of hypersonic
PROTOCOL (COMPUTERS)	A parametric analysis of radiative structure in aerobrake	combustion
RTOK elimination with TSMM Rerurn Tested OK	shock layers [AIAA PAPER 92-2970] p 816 A92-46985	[AD-A248558] p 896 N92-29580
reproduction using time stress measurement module	RADIATIVE HEAT TRANSFER	REACTING FLOW
p 902 A92-48446	A parametric analysis of radiative structure in aerobrake	Hypersonic plasma predictions at nonzero angle of attack
Application of VME-technology on an airborne data link	shock layers	[AIAA PAPER 92-3027] p 925 A92-47028
processor unit [NLR-MP-88040-U] p 841 N92-29615	[AIAA PAPER 92-2970] p 816 A92-46985	Computation of hypersonic flowfields in thermal and
PROTOTYPES	Decoupled predictions of radiative heating in air using	chemical nonequilibrium
Flexible manufacturing in repair of gas turbine engine	a particle simulation method [AIAA PAPER 92-2971] p 816 A92-46986	[AIAA PAPER 92-2874] p 819 A92-47856
components	Heat transfer characteristics of hypersonic waveriders	Progress towards the development of transient ram
[AIAA PAPER 92-3524] p 786 A92-49049	with an emphasis on leading edge effects	accelerator simulation as part of the U.S. Air Force
PROVING	[AIAA PAPER 92-2920] p 821 A92-47892	Armament Directorate Research Program
Experimental validation of a line-duct acoustics model	Analytical and experimental studies of heat pipe radiation	[AIAA PAPER 92-3248] p 904 A92-48847
including flow [NLR-TP-90223-U] p 927 N92-28695	cooling of hypersonic propulsion systems [AIAA PAPER 92-3809] p 867 A92-49128	A simplified reaction mechanism for prediction of NO(x) emissions in the combustion of hydrocarbons
PSYCHOLOGICAL TESTS	RADIO ALTIMETERS	[AIAA PAPER 92-3340] p 894 A92-48919
Mandatory psychological testing of pilots as a	Radioaltimeter RWL-750 p 855 A92-45374	Modeling of the reactant conversion rate in a turbulent
requirement for licensing in Norway?	RADIO COMMUNICATION	shear flow p 829 N92-28820
p 835 A92-45081	Data Link integration in commercial transport	REACTION KINETICS
PULSED JET ENGINES	operations p 839 A92-44919	Fuel regression mechanism in a solid fuel ramjet
Pulse jet one-way valve performance	Remote telemetry concepts p 882 A92-47562 RADIO FREQUENCIES	p 860 A92-44898
[AIAA PAPER 92-3169] p 863 A92-48790	Improving the LAMP Mk 3 SH-60B HF communication	A simplified reaction mechanism for prediction of NO(x) emissions in the combustion of hydrocarbons
PUMPS Variable displacement electro-hydrostatic actuator for	system	[AIAA PAPER 92-3340] p 894 A92-48919
flight control systems p 876 A92-48492	[AD-A245970] p 910 N92-29344	An analysis of combustion studies in shock expansion
PYROMETERS	RADIO NAVIGATION	tunnels and reflected shock tunnels
Experimental pyrometer system for a gas turbine	Selected models of aircraft navigation space	[NASA-TP-3224] p 895 N92-28374
engine	p 839 A92-45373 RADIO RELAY SYSTEMS	REAL GASES
[AIAA PAPER 92-3482] p 859 A92-49022	Feasibility study on a microwave-powered unmanned	Numerical simulations of hypersonic real-gas flows over space vehicles
	aerial vehicle for the communication relay utilization	[SAE PAPER 912045] p 791 A92-45429
Q	[SAE PAPER 912052] p 843 A92-45436	Second-order shock-expansion theory extended to
•	RAMAN SPECTRA	include real gas effects
QUALIFICATIONS	Measurement of scalar flowfield at exit of combustor	[AD-A247191] p 831 N92-29539
Diffuser casing upgrade for an advanced turbofan	sector using Raman diagnostics [AIAA PAPER 92-3350] p 894 A92-48927	REAL TIME OPERATION
[NLR-TP-90097-U] p 870 N92-28711	RAMJET ENGINES	Real-time control tower simulation for evaluation of airport surface traffic automation p 879 A92-44976
QUALITY CONTROL	Fuel regression mechanism in a solid fuel ramjet	
A manufacturer's approach to ensure long term	Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898	Simulation of triple simultaneous parallel ILS
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133	p 860 A92-44898 High spatial resolution measurements of ram accelerator	
A manufacturer's approach to ensure long term	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing
A manufacturer's approach to ensure long term p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using
A manufacturer's approach to ensure long term structural integrity QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AlAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AlAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AlAA PAPER 92-3248] p 904 A92-48847	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface
A manufacturer's approach to ensure long term p 838 N92-30133 CUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3277] p 894 A92-49105 Combustion of solid fueled ramjet. II	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3727] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3386] p 895 A92-49136	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model
A manufacturer's approach to ensure long term structural integrity QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3728] p 895 A92-49136 RANDOM ACCESS MEMORY	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] RADAR ATA Real targets, unreal displays - The inadvertent	p 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model
A manufacturer's approach to ensure long term structural integrity	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3728] p 895 A92-49136 RANDOM ACCESS MEMORY	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [IAIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data RADAR RANGE Bistatic scattering on a monostatic radar range p 849 A92-48408	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays the inadvertent suppression of critical radar data p 839 A92-44969 RADAR RANGE Bistatic scattering on a monostatic radar range p 849 A92-48408	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-47631 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data p 839 A92-44969 RADAR RANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SCATTERING Bistatic scattering on a monostatic radar range	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays the inadvertent suppression of critical radar data p 839 A92-44969 RADAR RANGE Bistatic scattering on a monostatic radar range p 849 A92-48408	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3286] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES)	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28540 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771
A manufacturer's approach to ensure long term structural integrity	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 895 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model IAIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of p 811 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data p 839 A92-44969 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49105 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28540 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data p 839 A92-44969 RADAR ANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AlAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AlAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AlAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AlAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AlAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AlAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AlAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AlAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR PANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49105 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECONNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46851
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR PANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3286] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AN-248033] p 926 N92-28302	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28540 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR PANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECONNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46851
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 (QUATERNIONS) NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 (Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 (NAL-TM-636] p 909 N92-28836 (NAL-TM-636) p 90	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3248] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3866] p 895 A92-49136 [RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 [RANDOM NOISE Comparison of three controllers applied to helicopter vibration [INASA-TM-102192] p 878 N92-28302 [RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [INASA-TM-103906] p 841 N92-29103	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 859 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data p 839 A92-44969 RADAR ANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR TARGETS IsoOppler and mocomp corrections improve MTI radar p 898 A92-45774 Location and tracking technique in a multistatic system established by multiple bistatic systems	High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3248] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [NASA-TM-103906] p 841 N92-29103	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 RECORDING HEADS Double Density recording acquisition and playback p 920 A92-47534 RECTANGULAR WINGS Aerodynamic characteristics near the tip of a finite wing
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA RADAR PANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR TARGETS IsoDoppler and mocomp corrections improve MT1 radar p 888 A92-45774 Location and tracking technique in a multistatic system established by multiple bistatic systems	High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3248] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28302 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 RANGEFINDING Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [NASA-TM-103906] p 841 N92-29103 RAREFIED GAS DYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45025 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-45037 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 859 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 RECORDING MEADS Double Density recording acquisition and playback p 920 A92-47534 RECORDING MEADS Aerodynamic characteristics near the tip of a finite wing by a panel method
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 R RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA Real targets, unreal displays - The inadvertent suppression of critical radar data p 839 A92-44969 RADAR RANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR TARGETS IsoDoppler and mocomp corrections improve MTI radar p 898 A92-48408 RADIAL TARGETS IsoDoppler and mocomp corrections improve MTI radar p 898 A92-45774 Location and tracking technique in a multistatic system established by multiple bistatic systems	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3728] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [NASA-TM-103906] p 841 N92-29103 RAREFIED GAS DYNAMICS Acceptable Applement sphere in hypersonic rarefied flow p 808 A92-45840	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28540 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 988 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 RECORDING HEADS Double Density recording acquisition and playback p 920 A92-47534 RECTANGULAR WINGS Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45131
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-247484] p 923 N92-28245 Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 RACKS (FRAMES) Liquid flow-through cooling for avionics applications p 902 A92-48448 RADAR APPROACH CONTROL Simulation of triple simultaneous parallel ILS approaches p 840 A92-45025 Autonomous landing - Functional requirements p 840 A92-48470 RADAR CROSS SECTIONS Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR DATA RADAR PANGE Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SCATTERING Bistatic scattering on a monostatic radar range p 849 A92-48408 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR SIGNATURES Global and high resolution radar cross section measurements and two-dimensional microwave images of a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] p 911 N92-29877 RADAR TARGETS IsoDoppler and mocomp corrections improve MT1 radar p 888 A92-45774 Location and tracking technique in a multistatic system established by multiple bistatic systems	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3248] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49105 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [NASA-TM-103906] p 841 N92-29103 RAREFIED GAS DYNAMICS Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow about a delta wing - direct	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system p 840 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 888 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 RECONDING HEADS Double Density recording acquisition and playback p 920 A92-47534 RECTANGULAR WINGS Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 LDV measurements in the three-dimensional near wake
A manufacturer's approach to ensure long term structural integrity p 838 N92-30133 (QUATERNIONS NPSNET: Flight simulation dynamic modeling using quaternions [AD-A247484] p 923 N92-28245 (Quaternion and Euler angles in kinematics [NAL-TM-636] p 909 N92-28836 (NAL-TM-636] p 909 N92-28836 (NAL-TM-636) p 909	P 860 A92-44898 High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic problems [AIAA PAPER 92-3246] p 904 A92-48845 Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program [AIAA PAPER 92-3248] p 904 A92-48847 Numerical simulations of the transdetonative ram accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] p 890 A92-48849 Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105 Combustion of solid fueled ramjet. II [AIAA PAPER 92-3727] p 894 A92-49106 A study of the flammability limit of the backward facing step flow combustion [AIAA PAPER 92-3728] p 895 A92-49136 RANDOM ACCESS MEMORY Ferroelectric memory evaluation and development system p 902 A92-48460 RANDOM NOISE Comparison of three controllers applied to helicopter vibration [NASA-TM-102192] p 878 N92-28457 RANGE (EXTREMES) Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 A rotorcraft flight database for validation of vision-based ranging algorithms [NASA-TM-103906] p 841 N92-29103 RAREFIED GAS DYNAMICS Acceptable Applement sphere in hypersonic rarefied flow p 808 A92-45840	Simulation of triple simultaneous parallel ILS approaches p 880 A92-45027 The development of a real time visual flight simulator for tactical operations research and measurement p 880 A92-45027 Construction of a real-time DGPS experimental system p 840 A92-47631 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 NPSNET: Flight simulation dynamic modelling using quaternions [AD-A247484] p 923 N92-28245 A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28540 NARSIM: A real-time simulator for air traffic control research [NLR-TP-90147-U] p 988 N92-29204 REATTACHED FLOW Predictions of a turbulent backward-facing-step flow with a cubic pressure-strain model [AIAA PAPER 92-2647] p 796 A92-45514 RECOGNITION Sensor fault detection on board an aircraft with observer and polynomial classifier [DLR-FB-91-34] p 859 N92-29870 RECONNAISSANCE AIRCRAFT Reduction and analysis of F-111C flight data [AD-A250341] p 853 N92-28771 RECONSTRUCTION Reconstruction of flight path in turbulence p 874 A92-46777 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 RECORDING HEADS Double Density recording acquisition and playback p 920 A92-47534 RECTANGULAR WINGS Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45131

REENTRY SUBJECT INDEX

quasi-three-dimensional cascade flows --- renormalization

turbulence model based on

REVERSED FLOW

for SSTOVL aircraft

Internal reversing flow in a tailpipe offtake configuration

RENORMALIZATION GROUP METHODS

LDV measurements on a rectangular wing with a

p 800 A92-45537

simulated glaze ice accretion

IAIAA PAPER 92-26901

Self-induced roll oscillations of low-aspect-ratio group methods p 868 N92-28418 INASA-TM-105698 p 874 A92-46802 IAIAA PAPER 92-33121 o 825 A92-48898 REYNOLDS EQUATION rectangular wings REENTRY REPLACING Numerical investigation of tail buffet on F-18 aircraft Calculation of hypersonic, viscous, non-equilibrium flows Bearing servicing tool (NASA-CASE-MSC-21881-1) I AIAA PAPER 92-2673 I p 798 A92-45528 p 912 N92-30082 around reentry bodies using a coupled boundary Comparative study of turbulence models in predicting layer/Euler method hypersonic inlet flows REPORTS IAIAA PAPER 92-28561 p 819 A92-47839 IAIAA PAPER 92-30981 p 824 A92-48740 DLR research reports and communications REENTRY TRAJECTORIES REYNOLDS NUMBER [ETN-92-91391] p 929 N92-29218 A transonic/supersonic/hypersonic CFD analysis of the Dynamic LEX/forebody vortex interaction effects REQUIREMENTS entry Space Shuttle Orbiter [AIAA PAPER 92-2732] p 804 A92-45566 Saenger: The reference concept and its technological Calibration-related pseudo-Reynolds number trends in JAIAA PAPER 92-26141 p 805 A92-45571 requirements - aerothermodynamics p 882 A92-46780 Similarity relations for calculating three-dimensional transonic wind tunnels [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 chemically nonequilibrium viscous flows REYNOLDS STRESS Aerothermodynamic challenges of the Saenger n 827 A92-49188 Navier-Stokes investigation of a transonic centrifugal space-transportation system REENTRY VEHICLES compressor stage using an algebraic Reynolds stress [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 Experimental and numerical studies of radiation emission model RESEARCH IAIAA PAPER 92-3311 from high-temperature air behind 10 km/s shock waves n 825 A92-48897 Aeronautical Engineering Group publications, 1950 -[SAE PAPER 912025] p 790 A92-45417 RIEMANN MANIFOLD Multidimensional Euler/Navier-Stokes analysis for Mesh adaption for 2D transsonic Euler flows on nstructured meshes p 816 A92-47038 [AEBO-REPT-8907] p 910 N92-29683 hypersonic equilibrium gas unstructured meshes p 790 A92-45418 RESEARCH AIRCRAFT [SAE PAPER 912026] Anisotropic control of mesh generation based upon a Aerodynamic development of boundary layer control p 918 A92-47043 Calculation of high speed base flows Voronoi type method system for NAL QSTOL research aircraft 'ASKA' p 799 A92-45531 I AIAA PAPER 92-26791 RIGID ROTORS p 843 A92-45410 An adaptive grid method for computing the high speed [SAE PAPER 912010] Aeromechanical stability of hingeless helicopter rotors p 874 A92-46923 3D viscous flow about a re-entry vehicle Aerodynamic characteristics obtained from alpha sweep in forward flight RIGID STRUCTURES p 799 A92-45534 1AIAA PAPER 92-26851 test of the quiet STOL experimental aircraft ASKA Gridding strategies and associated results for winged (NAL-TR-1112) p 853 N92-28901 A general purpose nonlinear rigid body mass finite p 918 A92-47051 element for application to rotary wing dynamics entry vehicles Feedback control laws for highly maneuverable Acquisition of an aerothermodynamic data base by p 846 A92-46924 [NASA-CR-190535] means of a winged experimental reentry vehicle o 879 N92-29654 Quaternion and Euler angles in kinematics p 787 N92-30232 [MBB/FE202/S/PUB/461] [NAL-TM-636] p 909 N92-28836 Flight evaluation of an extended engine life mode on RIGID WINGS REFLECTION an F-15 airplane Thermal response of rigid and flexible insulations and Wing design for hanggliders having minimum induced [NASA-TM-104240] p 871 N92-29659 reflective coating in an aeroconvective heating p 811 A92-46814 RESEARCH AND DEVELOPMENT RIGIDITY environment Putting the control back in air traffic control - An enhanced Universal Development Simulation System [NASA-TM-103925] p 852 N92-28721 A method of failure analysis of complicated structures REGULATIONS p 901 A92-47656 p 916 A92-44982 Airline deregulation - Impact on human factors Emerging technology in the Soviet Union: Selected p 834 A92-44999 Structural risk assessment in the Israel Air Force for paners with analysis REINFORCED SHELLS fleet management p 836 A92-46779 [ISBN 1-55831-117-1] p 929 A92-46201 ROBUSTNESS (MATHEMATICS) Damaged stiffened shell research at NASA, Langley Aviation, motor, and space designs --- research and development in U.S.S.R. p 784 A92-46202 p 914 N92-30115 Research Center Prismatic grid generation with an efficient algebraic RELIABILITY method for aircraft configurations The impact of advanced materials on small turbine p 803 A92-45559 Turbine aircraft engine operational trending and JT8D static component reliability study [AIAA PAPER 92-2721] Comparison of six robustness tests evaluating missile [SAE PAPER 911207] p 862 A92-48021 p 870 N92-28686 [DOT/FAA/CT-91/10] autopilot robustness to uncertain aerodynamics Concurrent engineering in design of aircraft structures Simple fly-by-wire actuator p 876 A92-48491 p 873 A92-46737 p 854 N92-29650 [MBB-FE-2-S-PUB-472] Robust discrete controller design for an unmanned C-141 and C-130 power-by-wire flight control systems research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 p 876 A92-48493 p 926 A92-48500 Communication: An important element of maintenance p 838 N92-30124 Optics in aircraft engines Robustness characteristics of fast-sampling digital PI Aging commuter aeroplanes: Fatigue evaluation and Avionics software reusability observations p 915 N92-30132 p 921 A92-48502 controllers for high-performance aircraft with impaired control methods recommendations A manufacturer's approach to ensure long term control surfaces p 877 A92-48496 RESEARCH FACILITIES p 838 N92-30133 structural integrity Investigation of three-dimensional flow field in a turbine Compensating for manufacturing and life-cycle variations in aircraft engine control systems RELIABILITY ANALYSIS including rotor/stator interaction. I - Design development [AIAA PAPER 92-3869] Probability analysis of structure failure for the wings with p 868 A92-49139 and performance of the research facility p 883 A92-48908 main and subordinate components p 848 A92-47657 ROCKET ENGINES [AIAA PAPER 92-3325] A failure analysis for landing gear structural system Experimental aerodynamic facilities of the Aerodynamics Introduction --- propulsion system performance for p 849 A92-47667 hypersonic vehicles p 862 A92-46427 Research and Concepts Assistance Branch A sensitivity analysis on component reliability from Propulsion systems from takeoff to high-speed flight [AD-A247489] p 883 N92-28248 fatigue life computations Expand turbulence laboratory facilities to meet new DOD p 889 A92-46428 [AD-A247430] p 908 N92-28425 An experimental investigation of high-aspect-ratio research interest RELIABILITY ENGINEERING [AD-A248581] p 883 N92-28388 cooling passages [AIAA PAPER 92-3154] Advanced Rotorcraft Transmission (ART) - Component p 890 A92-48780 Use of a research simulator for the development of new p 885 N92-28543 RODS Concepts of flight control p 905 A92-48939 TAIAA PAPER 92-33661 The basic research simulator programme and the Combined load test apparatus for flat panels REMOTELY PILOTED VEHICLES [NASA-CASE-LAR-14698-1] p 911 N92-30028 industrial and aerospace community: Opportunities for Ducted fan VTOL for working platform cooperative research [SAE PAPER 911995] p 843 A92-45397 p 887 N92-28579 Prediction of leading-edge vortex breakdown on a delta JLR-6621 Feasibility study on a microwave-powered unmanned RESEARCH PROJECTS wing oscillating in roll
[AIAA PAPER 92-2677] DLR research reports and communications p 807 A92-45585 aerial vehicle for the communication relay utilization p 929 N92-29218 IETN-92-913911 [SAE PAPER 912052] p 843 A92-45436 ROLLING MOMENTS RESEARCH VEHICLES Structural concept of main wings of high altitude Self-induced roll oscillations of low-aspect-ratio Rotorcraft In-Flight Simulation Research at NASA Ames unmanned aerial vehicle and basic properties of p 874 A92-46802 rectangular wings Research Center: A Review of the 1980's and plans for thermoplastic composites as candidate material ROTARY STABILITY p 843 A92-45437 the 1990's Aeromechanical stability of hingeless helicopter rotors ISAE PAPER 9120531 [NASA-TM-103873] p 853 N92-28926 p 874 A92-46923 Unsteady aerodynamics of a Wortmann wing at low RESIDUAL STRENGTH Reynolds numbers p 810 A92-46778 Bilinear formulation applied to the stability and response Damaged stiffened shell research at NASA. Langley Stability and control flight testing of a half-scale Pioneer of helicopter rotor blade p 847 A92-46930 p 914 N92-30115 Explicit Navier-Stokes computation of turbomachinery remotely piloted vehicle **RESIDUAL STRESS** p 879 N92-28801 flows [AD-A245973] Surface residual stress analysis of metals and alloys [AD-A249284] p 909 N92-28879 A preliminary design and analysis of an advanced [AD-A248372] p 895 N92-28426 heat-rejection system for an extreme altitude advanced Explicit Navier-Stokes computation of turbomachinery **RESIN TRANSFER MOLDING** variable cycle diesel engine installed in a high-altitude advanced research platform Resin transfer molding of a complex composite aircraft flows [AD-A248458] p 911 N92-29933 p 784 A92-47410 [NASA-CR-186021] p 871 N92-29427 **ROTARY WING AIRCRAFT** RESONANT FREQUENCIES International Pacific Air and Space Technology Conference and Aircraft Symposium, 29th, Gifu, Japan, REMOVAL Analytical evaluation of resonant response of spiral bevel Paint removal using cryogenic processes gears in the RAH-66 helicopter Fantail transmission Oct. 7-11, 1991, Proceedings [AD-A247668] p 895 N92-28912 p 906 A92-49031 [AIAA PAPER 92-3495] **RENDEZVOUS TRAJECTORIES** RESONANT VIBRATION [SAE P-246] p 783 A92-45376 Free vibration analysis of branched blades by the The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-4 Time-to-go estimation from infrared images p 847 A92-47122 p 840 A92-48308 integrating matrix method p 842 A92-45381 A-40

Prediction of rotor unsteady airloads using vortex ROTOR AERODYNAMICS Boundary-layer measurements during a parallel Sensitivity analysis of discrete periodic systems with blade-vortex interaction filament theory p 792 A92-45484 [AIAA PAPER 92-2610] applications to helicopter rotor dynamics [AIAA PAPER 92-2623] p 846 A92-46884 Periodic trim solutions with hp-version finite elements AHS International Specialists' Meeting on Rotorcraft Experimental and numerical study of flow around p 874 A92-46931 Basic Research, Georgia Institute of Technology, Atlanta, p 814 A92-46948 helicopter rotor blade tips Advanced Rotorcraft Transmission (ART) Program Mar. 25-27, 1991, Proceedings Flow visualisation of a small diameter rotor operating Modeling of the control systems of rotary wing aircraft Review) p 875 A92-47783 summary [AIAA PAPER 92-3365] at high rotational speeds with blades at small pitch p 905 A92-48938 p 814 A92-46949 High speed rotorcraft propulsion concepts to control ROTORS A unified procedure for solving rotor flowfield, power/speed characteristics Rotor support for the STME oxygen turbopump performance and interference p 814 A92-46950 [AIAA PAPER 92-3282] p 865 A92-48940 1AIAA PAPER 92-33671 Efficient high-resolution rotor wake calculations using The application of flight simulation models in support Assessment of valve actuator motor rotor degradation flow field reconstruction p 814 A92-46951 of rotorcraft design and development by Fourier Analysis of current waveform An Eulerian/Lagrangian method for computing p 884 N92-28527 [DE92-013233] blade/vortex impingement p 814 A92-46952 Multi-channel fiber optic rotary joint for single-mode Rotorcraft In-Flight Simulation Research at NASA Ames Three-dimensional blade vortex interactions Research Center: A Review of the 1980's and plans for p 815 A92-46953 [AD-D015273] the 1990's Experimental and computational studies of hovering p 853 N92-28926 [NASA-TM-103873] Superconducting bearings with rotor flows p 815 A92-46954 Contingency power for a small turboshaft engine by using Initial validation of an unsteady Euler/Navier-Stokes flow INASA-CASE-GSC-13346-11 water injection into turbine cooling air solver for helicopter rotor airloads in forward flight [NASA-TM-105680] p 871 N92-29661 RUDDERS p 815 A92-46956 Effects of leading and trailing edge flaps on the ROTARY WINGS A numerical study of control surface buzz using Free wake analyses of a hovering rotor using panel aerodynamics of airfoil/vortex interactions computational fluid dynamic methods p 815 A92-46957 method IAIAA PAPER 92-26541 [SAE PAPER 912004] p 789 A92-45405 A new integral equation for potential compressible RUNGE-KUTTA METHOD aerodynamics of rotors in forward flight Impact response of composite UHB propeller blades Numerical simulations using a dynamic solution-adaptive p 815 A92-46958 [SAE PAPER 912046] p 861 A92-45430 grid algorithm, with applications to unsteady internal Assessment of one-dimensional icing forecast model policed to stratiform clouds p 915 A92-46803 Progress in Research on helicopter rotors p 849 A92-48589 based on BAC applied to stratiform clouds aerodynamics, aeroelasticity and acoustics [AIAA PAPER 92-2719] [ONERA, TP NO. 1992-27] Sensitivity analysis of discrete periodic systems with A finite difference solution of the Euler equations on turbulence model applications to helicopter rotor dynamics non-body-fitted Cartesian grids p 846 A92-46884 quasi-three-dimensional cascade flows --- renormalization RUNWAY CONDITIONS aroup methods Prediction of dynamic hub load of a rotor executing ASTOVL flexibility in the 21st century [AIAA PAPER 92-3312] p 825 A92-48898 multiple sinusoidal blade pitch variations p 846 A92-46921 Numerical flow simulation and analysis of a shrouded Ground surface erosion - British Aerospace test facility Chaotic oscillation in helicopter blade stall response propfan rotor and experimental studies [AIAA PAPER 92-3773] p 826 A92-49118 p 846 A92-46922 A neural network based postattack damage assessment Aeromechanical stability of hingeless helicopter rotors LAH-main rotor model test at the DNW p 874 A92-46923 [NLR-TP-90305-U] p 852 N92-28687 system in forward flight ROTOR BLADES RUNWAYS A general purpose nonlinear rigid body mass finite A methodology for the evaluation of runway roughness element for application to rotary wing dynamics Prediction of rotor unsteady airloads using vortex filament theory for repair p 846 A92-46924 [AIAA PAPER 92-2610] IAD-A2504071 p 792 A92-45484 Chaotic dynamic behavior in a simplified rotor blade lag The relationship between tensile and flexural strength model p 846 A92-46926 of unidirectional composites On the choice of appropriate bases for nonlinear namic modal analysis p 847 A92-46927 p 891 A92-45629 S Approach for analysis and design of composite rotor dynamic modal analysis lades p 899 A92-46801 Free vibration analysis of branched blades by the blades Bilinear formulation applied to the stability and response S CURVES of helicopter rotor blade p 847 A92-46930 An aeroelastic analysis with a generalized dynamic integrating matrix method p 847 A92-47122 New method of swirl control in a diffusing S-duct p 847 A92-46932 A new method of helicopter rotor blade motion control wake p 875 A92-47786 SAAB AIRCRAFT The unsteady interaction of a 3-dimensional vortex LAH-main rotor model test at the DNW filament with a cylinder p 813 A92-46934 A manufacturer's approach to ensure long term ROTOR BLADES (TURBOMACHINERY)
Segmental heat transfer: A study of rotor wake development and wake/body structural integrity interactions in hover p 813 A92-46935 SAFETY Linear analysis of naturally curved and twisted Segmental heat transfer in a pin fin channel with ejection Buffet test in the National Transonic Facility p 900 A92-47267 anisotropic beam p 899 A92-46936 holes [NASA-CR-189595] ROTOR BODY INTERACTIONS On the adequacy of modeling turbulence and related SAFETY FACTORS Sensitivity analysis of discrete periodic systems with p 847 A92-46945 effects on helicopter response The appropriate concern for possible aberrations in Dynamic analysis of rotor flex-structure based on applications to helicopter rotor dynamics landing guidance signals nonlinear anisotropic shell models p 899 A92-46946 p 846 A92-46884 Safety vs. economy, system-theoretic approach to the The unsteady interaction of a 3-dimensional vortex Experimental and numerical study of flow around problem analysis helicopter rotor blade tips p 813 A92-46934 p 814 A92-46948 filament with a cylinder SAFETY MANAGEMENT A study of rotor wake development and wake/body Eulerian/Lagrangian method for computing Maintaining the safety of an aging fleet of aircraft p 814 A92-46952 interactions in hover p 813 A92-46935 blade/vortex impingement Aerodynamic parametric studies and sensitivity analysis Interaction between a rotor tip vortex and a separated SANDWICH STRUCTURES p 816 A92-46959 for rotor blades in axial flight flowfield p 814 A92-46947 Design and use of aramid fiber in aircraft structures unified procedure for solving rotor flowfield, Free vibration analysis of branched blades by the p 814 A92-46950 p 847 A92-47122 performance and interference integrating matrix method SATELLITE DESIGN A Mach-scaled powered model for rotor-fuselage Research on helicopter rotors - aerodynamics, aeroelasticity and acoustics - Progress in Quaternion and Euler angles in kinematics interactional aerodynamics and fliaht mechanics (NAL-TM-636) [ONERA, TP NO. 1992-27] p 849 A92-48589 investigations p 847 A92-46960 SCALARS ROTOR DYNAMICS Influence of geometrical parameters on helicopter rotor Modeling of the reactant conversion rate in a turbulent Prediction of dynamic hub load of a rotor executing high speed impulsive noise shear flow [ONERA, TP NO. 1992-40] multiple sinusoidal blade pitch variations SCALE EFFECT p 926 A92-48601 p 846 A92-46921 A semi empirical method for the analytical representation Scale effects on the flow past the mated Space Shuttle A general purpose nonlinear rigid body mass finite of stationary measured profile coefficients for applications configuration element for application to rotary wing dynamics [AIAA PAPER 92-2680] of rotary wing aerodynamics p 846 A92-46924 p 832 N92-29741 SCALE MODELS IETN-92-914911 Chaotic dynamic behavior in a simplified rotor blade tag **ROTATING SHAFTS** Maximizing thrust-vectoring control power and agility Active magnetic bearings give systems a lift model p 846 A92-46926 On the choice of appropriate bases for nonlinear p 901 A92-48201 A Mach-scaled powered model dynamic modal analysis p 847 A92-46927 ROTATING STALLS interactional aerodynamics and Bilinear formulation applied to the stability and response Wind-tunnel compressor stall monitoring using neural investigations p 918 A92-46817 of helicopter rotor blade p 847 A92-46930 Scale model test results of a multi-slotted vectoring ROTOR SPEED Numerical investigation of surge and rotating stall in 2DCD ejector nozzle Flow visualisation of a small diameter rotor operating [AIAA PAPER 92-3264] multistage axial compressors p 825 A92-48804 at high rotational speeds with blades at small pitch [AIAA PAPER 92-3193] SCENE ANALYSIS p 814 A92-46949 A theoretical study of sensor-actuator schemes for angles Time-to-go estimation from infrared images Explicit Navier-Stokes computation of turbomachinery rotating stall control [AIAA PAPER 92-3486] SCIENTISTS p 878 A92-49025 flows [AD-A249284] Dynamic control of aerodynamic instabilities in gas p 909 N92-28879 NASA engineers and the age of Apollo

ROTORCRAFT AIRCRAFT

[AIAA PAPER 92-2609]

aerial vehicle

Navier-Stokes and Euler solutions for an unmanned

p 792 A92-45483

p 870 N92-28466

p 912 N92-30044

Non-linear interactions in homogeneous turbulence with

turbine engines

and without background rotation

p 794 A92-45495

p 846 A92-46919

p 904 A92-48872

p 909 N92-28814

p 927 N92-29095

levitation control

p 909 N92-29099

p 806 A92-45578

p 803 A92-45557

p 818 A92-47153

p 783 A92-45309

p 881 A92-45323

p 922 A92-48520

p 887 N92-28772

p 809 A92-45859

p 838 N92-30133

p 888 N92-29352

p 839 A92-44932

p 916 A92-45002

p 837 N92-30108

p 784 A92-47407

p 909 N92-28836

p 829 N92-28820

p 799 A92-45532

p 874 A92-46794

for rotor-fuselage

flight mechanics p 847 A92-46960

p 864 A92-48859

p 840 A92-48308

p 929 N92-28344

p 897 A92-45606

Effect of flow rate on loss mechanisms in a backswept

[NASA-SP-4104]

SECONDARY FLOW

centrifugal impeller

SHAPES

Wake mixing and performance measurements in a linear

compressor cascade with crenulated trailing edges Adaptive parallel meshes with complex geometry compression ramp interactions p 824 A92-48800 p 918 A92-47050 [AIAA PAPER 92-3188] Multiple shock-shock interference on a cylindrical A study on the impact of shroud geometry on ejector Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil leading edge pumping performance Measurement of shock-wave/boundary-layer interaction in a free-piston shock tunnel p 813 A92-46903

Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks | AIAA PAPER 92-3260 | p 864 A92-48856 [NASA-TM-105743] p 828 N92-28674 Examination of the main error factors with regards to A semi empirical method for the analytical representation secondary losses in compression and turbine cascades of stationary measured profile coefficients for applications [AIAA PAPER 92-2879] by variations of the blade picture ratio of rotary wing aerodynamics Experience with the Johnson-King turbulence model in IÉTN-92-914931 p 871 N92-29927 [ETN-92-91491] p 832 N92-29741 SEMIEMPIRICAL EQUATIONS SHARP LEADING EDGES a transonic turbine cascade flow solver Numerical investigation into high-angle-of-attack leading-edge vortex flow Rapid synthesis for evaluating missile maneuverability narameters. Internal shock interactions in propulsion/airframe [AIAA PAPER 92-2615] p 873 A92-45488 [AIAA PAPER 92-2600] p 791 A92-45477 integrated three-dimensional sidewall compression A semi empirical method for the analytical representation Aerodynamically blunt and sharp bodies of stationary measured profile coefficients for applications | AIAA PAPER 92-2727 | p 808 A92-45597 I AIAA PAPER 92-3099 I Numerical simulation of a confined transonic normal Analysis of results of an Euler-equation method applied of rotary wing aerodynamics [ETN-92-91491] p 832 N92-29741 shock wave/turbulent boundary layer interaction to leading-edge vortex flow SENSITIVITY NLR-TP-90368-U1 I AIAA PAPER 92-36681 p 827 N92-28657 Determination of aerodynamic sensitivity coefficients SHOCK WAVE PROFILES SHEAR FLOW based on the three-dimensional full potential equation Evaluation of outdoor-to-indoor response to minimized Some exact and numerical results for plane steady [AIAA PAPER 92-2670] p 798 A92-45525 Sensitivity analysis of discrete periodic systems with sonic booms INASA-CR-1896431 sheared flow of an incompressible inviscid fluid p 821 A92-48019 Modeling of the reactant conversion rate in a turbulent SHOCK WAVE PROPAGATION applications to helicopter rotor dynamics p 846 A92-46884 p 829 N92-28820 Oscillation of oblique shock waves generated in a two SHEAR LAYERS dimensional asymmetric nozzle Sensitivity of tire response to variations in material and geometric parameters ISAE PAPER 9120611 Effect of walls on the supersonic reacting mixing layer p 912 N92-30065 A sensitivity analysis on component reliability from The effect of molecular relaxation processes in air on fatique life computations SHEAR STRENGTH the rise time of sonic booms [AD-A247430] p 908 N92-28425 Tensile and interlaminar properties of GLARE (trade SHOCK WAVES Determination of aerodynamic sensitivity coefficients for Shock fitting with a finite volume approximation to the name) laminates wings in transonic flow p 895 N92-28921 IAD-A2501881 Euler equations INASA-CR-1905701 p 832 N92-29657 [AIAA PAPER 92-2646] SHEAR STRESS SENSORS Predictions of a turbulent backward-facing-step flow with An investigation of passive control methods for Design issues in a fiber optic sensor system architecture shock-induced separation at hypersonic speeds a cubic pressure-strain model [AIAA PAPER 92-2725] for aircraft engine control [AIAA PAPER 92-2647] p 796 A92-45514 Examination of ultraviolet radiation theory for bow shock [AIAA PAPER 92-3483] p 866 A92-49023 A new approach for the calculation of transitional A theoretical study of sensor-actuator schemes for rocket experiments rotating stall control
[AIAA PAPER 92-3486] [AIAA PAPER 92-2871] IAIAA PAPER 92-26691 p 798 A92-45524 p 878 A92-49025 Active thermal isolation for temperature responsive Second-order shock-expansion theory extended to SEPARATED FLOW include real gas effects sansars [AD-A247191] Numerical simulations of separated flows around [NASA-CASE-LAR-14612-1] p 911 N92-29954 oscillating airfoil for dynamic stall phenomena SHORT CRACKS Short cracks and durability analysis of the Fokker 100 [SAE PAPER 911991] p 788 A92-45393 Flight deck aerodynamics of a nonaviation ship wing/fuselage structure Turbulent drag reduction by p 810 A92-46790 laminar INLR-TP-90336-U1 thickening SHOCK HEATING [AIAA PAPER 92-2707] SHORT TAKEOFF AIRCRAFT p 801 A92-45549 Experimental and numerical studies of radiation emission Active control of vortex structures in a separating flow Wind tunnel investigation of an improved upper surface from high-temperature air behind 10 km/s shock waves [SAE PAPER 912025] p 790 A92-45417 over an airfoil blown flap transport semi-span model [AIAA PAPER 92-2728] p 804 A92-45563 Examination of ultraviolet radiation theory for bow shock [SAE PAPER 911993] A numerical study of control surface buzz using Results and lessons learned from the STOL and rocket experiments computational fluid dynamic methods AIAA PAPER 92-28711 p 901 A92-47853 Maneuver Demonstration Program [AIAA PAPER 92-2654] [SAE PAPER 912005] p 806 A92-45578 SHOCK LAYERS Separation patterns and flow structures about a Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA' A parametric analysis of radiative structure in aerobrake hemisphere-cylinder at high incidences shock layers [AIAA PAPER 92-2970] p 807 A92-45593 [AIAA PAPER 92-2712] p 816 A92-46985 [SAE PAPER 912010] p 843 A92-45410 Functional mock-up tests for flight control system of the NAL QSTOL research aircraft 'ASKA' Separated high enthalpy dissociated laminar hypersonic Enhancements to viscous-shock-layer technique flow behind a step - Pressure measurements p 820 A92-47873 [AJAA PAPER 92-2897] p 809 A92-45858 [SAE PAPER 912036] SHOCK TUBES p 881 A92-45422 The DAM vertical shock-tube A simulator study of a flight reference display for Simplified linear stability transition prediction method for p 880 A92-45096 powered-lift STOL aircraft separated boundary layers p 812 A92-46883 Expansion tube experiments for the investigation of computational/experimental Joint computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental [SAE PAPER 912067] ram-accelerator-related combustion and gasdynamic Nonlinear control design for slightly nonminimum phase p 812 A92-46890 [AIAA PAPER 92-3246] n 904 A92-48845 systems - Application to V/STOL aircraft Two-stream, supersonic, wake flowfield behind a thick p 876 A92-48160 Shock enhancement and control of hypersonic Verification and validation of F-15 and S/MTD unique base I - General features p 813 A92-46895 Computation of turbulent, separated, unswept combustion software (AD-A248558) p 896 N92-29580 compression ramp interactions p 813 A92-46897 Internal reversing flow in a tailpipe offtake configuration SHOCK TUNNELS Interaction between a rotor tip vortex and a separated owfield p 814 A92-46947 Vane-blade interaction in a transonic turbine. II - Heat for SSTOVL aircraft [NASA-TM-105698] p 868 N92-28418 transfer An improved multiple line-vortex method for simulation [AIAA PAPER 92-3324] Aerodynamic characteristics obtained from alpha sweep of separated vortices of slender wings An analysis of combustion studies in shock expansion test of the quiet STOL experimental aircraft ASKA p 819 A92-47694 p 853 N92-28901 tunnels and reflected shock tunnels Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [NASA-TP-3224] SHROUDED NOZZLES p 895 N92-28374 SHOCK WAVE INTERACTION A study on the impact of shroud geometry on ejector [ONERA, TP NO. 1992-1] p 821 A92-48577 pumping performance Experimental and numerical studies of radiation emission Pulse jet one-way valve performance (AIAA PAPER 92-3169) p from high-temperature air behind 10 km/s shock waves [AIAA PAPER 92-3260] p 863 A92-48790 |SAE PAPER 912025| p 790 A92-45417 Inlet distortion effects in aircraft propulsion system induced interaction Shock by p 869 N92-28464 hemisphere-cylinders A method for computing the 3-dimensional flow about (SAE PAPER 912043) p 790 A92-45427 SIGNAL DETECTORS wings with leading-edge vortex separation. Part 2: Aerodynamic heating in three-dimensional shock wave Description of computer program VORSEP turbulent boundary layer interaction induced by sweptback [NLR-TR-86006-U] p 833 N92-29916 sharp fins in hypersonic flows SEQUENCING p 791 A92-45428 SIGNAL PROCESSING ISAE PAPER 9120441 System for generating sequences of phased gust or taxi Airfoil pressure measurements during oblique shock p 845 A92-46800 loadings wave-vortex interaction in a Mach 3 stream turbine engines SERVICE LIFE p 795 A92-45503 IAIAA PAPER 92-2631 I Electric actuation system duty fly-by-wire/power-by-wire control ty cycles --- in p 877 A92-48494 Surface and flow field measurements in a symmetric

crossing shock wave/turbulent boundary layer flow [AIAA PAPER 92-2634] p 806 A92-45574

computational fluid dynamic methods

I AIAA PAPER 92-2654 I

turbulent boundary layer

A numerical study of control surface buzz using

Interaction between crossing oblique shocks and a

p 806 A92-45578

p 812 A92-46882

Computation of turbulent

separated.

unswent

p 813 A92-46897

p 813 A92-46899

p 820 A92-47860

p 821 A92-48207

p 824 A92-48741

p 826 A92-49088

n 927 N92-28556

p 791 A92-45443

p 898 A92-45883

p 796 A92-45513

p 808 A92-45596

p 901 A92-47853

p 831 N92-29539

p 910 N92-29603

p 789 A92-45395

p 843 A92-45406

p 855 A92-45449

p 921 A92-48515

SHAFTS (MACHINE ELEMENTS)

Application of face-gear drives

the turbine rotor shaft

INASA-TM-1056551

transmissions

Magnetic particle testing of turbine blades mounted on

p 898 A92-46498

p 908 N92-28434

in helicopter

SIGNATURE ANALYSIS	Partitioned software support concept for modular	SPACECRAFT CONTROL
Evaluation of outdoor-to-indoor response to minimized sonic booms	embedded computer software p 922 A92-48518 SOLAR GENERATORS	A design of strongly stabilizing controller SAE PAPER 912081 p 917 A92-45456
[NASA-CR-189643] p 927 N92-28556	High-altitude lighter-than-air powered platform	SPACECRAFT MANEUVERS
SIGNATURES	[SAE PAPER 912054] p 844 A92-45438	Rapid synthesis for evaluating missite maneuverability
Evaluation of outdoor-to-indoor response to minimized	SOLID PROPELLANT COMBUSTION	parameters
sonic booms	Fuel regression mechanism in a solid fuel ramjet	[AIAA PAPER 92-2615] p 873 A92-45488
[NASA-CR-189643] p 927 N92-28556	p 860 A92-44898	SPACECRAFT PROPULSION
SIKORSKY AIRCRAFT	Combustion of solid fueled ramjet. I	Saenger: The reference concept and its technological
Civil development and certification of a helicopter	[AIAA PAPER 92-3727] p 894 A92-49105	requirements - aerothermodynamics
automatic approach and hover system on the Sikorsky	SOLID PROPELLANT ROCKET ENGINES Combustion of solid fueled ramjet. II	[MBB-FE-202-S-PUB-0463-A] p 890 N92-29629
S-76	[AIAA PAPER 92-3728] p 894 A92-49106	Technology programme: Aerothermodynamics and
[SAE PAPER 911975] p 872 A92-45382 SILICON	SOLID SURFACES	propulsion integration. Numerical and experimental aerothermodynamics
Applications of silicon hybrid multi-chip modules to	Analysis of motion of airfoil flying over wavy-wall surface	[MBB-FE-202-S-PUB-0464-A] p 831 N92-29648
avionics p 859 N92-28379	(lifting surface method) p 818 A92-47100	Aerothermodynamics and propulsion integration in the
SIMD (COMPUTERS)	SONIC BOOMS	Saenger technology programme
Future directions in computing and CFD	The effect of molecular relaxation processes in air on	[MBB-FE-202-S-PUB-0469-A] p 831 N92-29649
[AIAA PAPER 92-2734] p 917 A92-45489	the rise time of sonic booms p 898 A92-45883	SPACECRAFT REENTRY
SIMILARITY THEOREM	Evaluation of outdoor-to-indoor response to minimized	Characteristics of the Shuttle Orbiter leeside flow during
Similarity relations for calculating three-dimensional	sonic booms [NASA-CR-189643] p 927 N92-28556	a reentry condition
chemically nonequilibrium viscous flows p 827 A92-49188	SOUND FIELDS	[AIAA PAPER 92-2951] p 821 A92-47915 New hypersonic test methods developed at ONERA -
SIMULATION	Solutions of acoustic field problems using parallel	The R5 and F4 wind tunnels
Full mission simulation: A view into the future	computers p 925 A92-45929	[ONERA, TP NO. 1992-39] p 882 A92-48600
p 884 N92-28537	SOUND INTENSITY	SPACECRAFT STRUCTURES
SIMULATORS	New methods to determine the transmission loss of	International Congress on Recent Developments in Air-
High-temperature miniaturized turbine engine lubrication	partitions using sound intensity measurements	and Structure-Borne Sound and Vibration, Auburn
system simulator	p 924 A92-45879	University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2
[AD-A249259] p 868 N92-28294	SOUND TRANSMISSION New methods to determine the transmission loss of	p 924 A92-45876
Full mission simulation: A view into the future p 884 N92-28537	partitions using sound intensity measurements	SPACECREWS Crew transportation for the 1990s. I - Commercializing
Use of a virtual cockpit for the development of a future	p 924 A92-45879	manned flight with today's propulsion
transport aircraft p 886 N92-28547	SOUND WAVES	p 889 A92-46726
The role of systems simulation for the development and	International Congress on Recent Developments in Air-	SPANWISE BLOWING
qualification of ATTAS p 886 N92-28548	and Structure-Borne Sound and Vibration, Auburn	Navier-Stokes computation of wing leading edge
The basic research simulator programme and the	University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2	tangential blowing for a tilt rotor in hover
industrial and aerospace community: Opportunities for	p 924 A92-45876	[AIAA PAPER 92-2608] p 805 A92-45568
cooperative research	SPACE NAVIGATION	Exploratory investigation of a spanwise blowing concept
[LR-662] p 887 N92-28579	DLR research reports and communications [ETN-92-91391] p 929 N92-29218	for tip-stall control on cranked-arrow wings
NARSIM: A real-time simulator for air traffic control research	SPACE PERCEPTION	[AIAA PAPER 92-2637] p 806 A92-45576 SPATIAL MARCHING
[NLR-TP-90147-U] p 888 N92-29204	Perspective versus plan view air traffic control (ATC)	Prediction of inviscid supersonic/hypersonic aircraft
SINGLE CRYSTALS	displays - Survey and empirical results	flowfields p 810 A92-46785
Advanced superalloys for turbine blade and vane	p 896 A92-44967	Grid adaptation to multiple functions for applied
applications	A re-analysis of the causes of Boeing 727 'black hole	aerodynamic analysis p 817 A92-47045
[ONERA, TP NO. 1992-2] p 893 A92-48578	landing' crashes p 833 A92-44985 An aircraft landing accident caused by visualty induced	SPATIAL RESOLUTION
Fatigue in single crystal nickel superalloys [AD-A248190] p 896 N92-29408	spatial disorientation p 834 A92-44993	High spatial resolution measurements of ram accelerator
[AD-A248190] p 896 N92-29408 SINGLE STAGE TO ORBIT VEHICLES	SPACE SHUTTLE MAIN ENGINE	gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844
	Rotor support for the STME oxygen turbopump	SPECIFIC IMPULSE
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds	[AIAA PAPER 92-3282] p 904 A92-48872	SPECIFIC IMPULSE Propulsion systems from takeoff to high-speed flight
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS	Propulsion systems from takeoff to high-speed flight p 889 A92-46428
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 91:2060] p 889 A92-45442	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER)	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 91:2060] p 889 A92-45442	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER)	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 9120411] p 836 A92-45425 SPECTRUM ANALYSIS
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 9854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of stender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2:	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins Ageing airplane repair assessment program for Airbus A300 p 838 N92-30113 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-8606-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES)	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPEAD SPECTRUM TRANSMISSION Global Positioning System telecommand link
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) [SAE PAPER 912039] p 835 A92-45424	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-8606-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES)	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPEAD SPECTRUM TRANSMISSION Global Positioning System telecommand link
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) [SAE PAPER 912039] p 835 A92-45424 SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0468-A] p 891 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0468-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0468-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) (SAE PAPER 912039) SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-Ay-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) [SAE PAPER 912039] p 835 A92-45424 SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0469-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384 Symptom of payload-induced flight instability
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency [SAE PAPER 912039] p 835 A92-45424 SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502 SOFTWARE REUSE Avionics software reusability observations and p 921 A92-48502	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0464-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 SPACE TRANSPORTATION SYSTEM FLIGHTS	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384 Symptom of payload-induced flight instability
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) (SAE PAPER 912039) SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502 SOFTWARE TOOLS	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0469-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-Ay-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384 Symptom of payload-induced flight instability p 873 A92-46761 Calculation of the aerodynamic derivatives of aircraft
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency [SAE PAPER 912039] p 835 A92-45424 SOFTWARE ENGINEERING Avionics software reusability observations and p 921 A92-48502 SOFTWARE REUSE Avionics software reusability observations and p 921 A92-48502	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0464-A] p 831 N92-29649 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0462-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 SPACE TRANSPORTATION SYSTEM FLIGHTS Performance of uncoated AFRS1 blankets during	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384 Symptom of payload-induced flight instability
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) (SAE PAPER 912039) SOFTWARE ENGINEERING Avionics software reusability observations and recommendations SOFTWARE REUSE Avionics software reusability observations and p 921 A92-48502 SOFTWARE TOOLS Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 Design and implementation of a generic Kalman filter	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion P 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0464-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 SPACE TRANSPORTATION SYSTEM FLIGHTS Performance of uncoated AFRSI blankets during multiple Space Shuttle flights [NASA-TM-103892] p 890 N92-29104	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) [SAE PAPER 912039] p 835 A92-45424 SOFTWARE PISUSE Avionics software reusability observations and p 921 A92-48502 SOFTWARE ROUSE Avionics software reusability observations and p 921 A92-48502 SOFTWARE TOOLS Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 Design and implementation of a generic Kalman filter in Ada p 858 A92-48475	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2614] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 SPACE TRANSPORTATION SYSTEM FLIGHTS Performance of uncoated AFRSI blankets during multiple Space Shuttle flights [NASA-TM-103892] p 890 N92-29104 SPACECRAFT CONFIGURATIONS Scale effects on the flow past the mated Space Shuttle	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link p 839 A92-47566 STABILITY DERIVATIVES Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384 Symptom of payload-induced flight instability p 873 A92-46761 Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779 STABILITY TESTS Stability and control flight testing of a half-scale Pioneer
Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion p 889 A92-46726 SKIN (STRUCTURAL MEMBER) Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins p 913 N92-30111 Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 SKIN FRICTION Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 SLENDER WINGS An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694 A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916 SMOKE The effect on aircraft evacuations of passenger behaviour and smoke in the cabin p 834 A92-44998 SMOKE DETECTORS Aircraft Command in Emergency Situations (ACES) (SAE PAPER 912039) SOFTWARE ENGINEERING Avionics software reusability observations and recommendations SOFTWARE REUSE Avionics software reusability observations and p 921 A92-48502 SOFTWARE TOOLS Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 Design and implementation of a generic Kalman filter	[AIAA PAPER 92-3282] p 904 A92-48872 SPACE SHUTTLE ORBITERS Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442 A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 SPACE SHUTTLES Scale effects on the flow past the mated Space Shuttle configuration [AIAA PAPER 92-2680] p 799 A92-45532 In-flight simulation studies at the NASA Dryden Flight Research Facility [NASA-TM-4396] p 853 N92-29110 SPACE TRANSPORTATION Crew transportation for the 1990s. I - Commercializing manned flight with today's propulsion P 889 A92-46726 Saenger: The reference concept and its technological requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme [MBB-FE-202-S-PUB-0464-A] p 831 N92-29649 Aerothermodynamic challenges of the Saenger space-transportation system [MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 SPACE TRANSPORTATION SYSTEM FLIGHTS Performance of uncoated AFRSI blankets during multiple Space Shuttle flights [NASA-TM-103892] p 890 N92-29104	Propulsion systems from takeoff to high-speed flight p 889 A92-46428 Propulsion system performance and integration for high Mach air breathing flight p 862 A92-46429 SPECTRAL METHODS Discrete modes and continuous spectra in supersonic boundary layers p 809 A92-46264 SPECTROGRAMS Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 A92-45425 SPECTRUM ANALYSIS Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180 A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 SPHERICAL CAPS Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 SPLINE FUNCTIONS Prediction of laminar boundary layer using cubic splines [AIAA PAPER 92-2702] p 801 A92-45544 SPLIT FLAPS Construction of a numerical optimization method for the definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 SPREAD SPECTRUM TRANSMISSION Global Positioning System telecommand link

STABILIZERS (FLUID DYNAMICS)	Prediction and measurement of jet flowfield features for	A failure analysis for landing gear structural system
Flow over a twin-tailed aircraft at angle of attack. II - Temporal characteristics p 810 A92-46781	ASTOVL aircraft p 787 A92-45318	p 849 A92-47667
STAGNATION POINT	A progress report on ASTOVL control concept studies under the VAAC programme p 871 A92-45319	Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473
Decoupled predictions of radiative heating in air using	Integrated flight/propulsion control for supersonic	Mathematical optimization: A powerful tool for aircraft
a particle simulation method	STOVL aircraft p 872 A92-45320	design p 851 N92-28474
[AIAA PAPER 92-2971] p 816 A92-46986 STAGNATION PRESSURE	ASTOVL engine control p 860 A92-45321	Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650
Combustion of solid fueled ramjet. II	Integrated flight control systems - Architectural considerations for future aircraft concepts	STRUCTURAL DESIGN CRITERIA
[AIAA PAPER 92-3728] p 894 A92-49106	p 872 A92-45322	Wing leading edge design with composites to meet bird
STANDARDS	Ground surface erosion - British Aerospace test facility	strike requirements p 848 A92-47404
Internationalization of telemetry systems p 920 A92-47535	and experimental studies p 881 A92-45323	Design and test of aircraft aft fuselage structure using
STATIC STABILITY	Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft	postbuckled shear panels p 848 A92-47406 Short cracks and durability analysis of the Fokker 100
Stability and control flight testing of a half-scale Pioneer	[AIAA PAPER 92-3094] p 824 A92-48738	wing/fuselage structure
remotely piloted vehicle	STRAIN GAGE BALANCES	[NLR-TP-90336-U] p 910 N92-29603
[AD-A245973] p 879 N92-28801 Calculation of support interferences on the aerodynamic	Studies in general aviation aerodynamics	STRUCTURAL ENGINEERING
coefficients for a wind tunnel calibration model	[NASA-CR-190431] p 827 N92-28511 STRAKES	A methodology for the evaluation of runway roughness for repair
[ESA-TT-1247] p 830 N92-29159	An experimental investigation of the effect of	[AD-A250407] p 887 N92-28772
STATIC TESTS	leading-edge extensions on directional stability and the	Concurrent engineering in design of aircraft structures
Strength evaluation and safety of machine/structure. III - Case examples on strength and safety evaluation of	effectiveness of forebody nose strakes [AIAA PAPER 92-2715] p 802 A92-45554	[MBB-FE-2-S-PUB-472] p 854 N92-29650 Repair procedures for advanced composites for
machine/structure 3.2 aircraft (airframe)	Forebody vortex control using small, rotatable strakes	helicopters
p 882 A92-47303	p 811 A92-46798	[MBB-UD-0606-91-PUB] p 787 N92-29874
Scale model test results of a multi-slotted vectoring	Helicopter low-speed yaw control	STRUCTURAL FAILURE
2DCD ejector nozzle [AIAA PAPER 92-3264] p 864 A92-48859	[NASA-CASE-LAR-14219-1] p 879 N92-30025 STRAPDOWN INERTIAL GUIDANCE	Structural risk assessment in the Israel Air Force for fleet management p 836 A92-46779
STATIC THRUST	Wideband control of gyro/accelerometer multisensors	A method of failure analysis of complicated structures
Experience in the operation of a hypersonic nozzle static	in a strapdown guidance system p 856 A92-46736	p 901 A92-47656
thrust stand	STRAPS	Probability analysis of structure failure for the wings with
[AIAA PAPER 92-3292] p 882 A92-48881 STATISTICAL ANALYSIS	Tear straps in airplane fuselage [AD-A248543] p 854 N92-29511	main and subordinate components p 848 A92-47657 Approximate analysis for failure probability of structural
Statistical prediction of maximum buffet loads on the	STRATOCUMULUS CLOUDS	systems p 901 A92-47671
F/A-18 vertical fin p 811 A92-46816	Assessment of one-dimensional icing forecast model	Turbine aircraft engine operational trending and JT8D
Atmospheric turbulence spectra and correlation functions	applied to stratiform clouds p 915 A92-46803	static component reliability study
[NLR-TP-89217-U] p 915 N92-28689	STREAM FUNCTIONS (FLUIDS) Experiments on the enhancement of compressible	[DOT/FAA/CT-91/10] p 870 N92-28686 A methodology for the evaluation of runway roughness
STATOR BLADES	mixing via streamwise vorticity. I - Optical measurements	for repair
Vane-blade interaction in a transonic turbine. II - Heat	[AIAA PAPER 92-3549] p 906 A92-49064	[AD-A250407] p 887 N92-28772
transfer [AIAA PAPER 92-3324] p 904 A92-48907	STREAMLINED BODIES	Structural integrity of future aging airplanes p 913 N92-30107
STATORS	Streamlines, vorticity lines, and vortices around three-dimensional bodies p 808 A92-45845	Maintaining the safety of an aging fleet of aircraft
Comparison between two 3D-NS-codes and experiment	STREAMS	p 837 N92-30108
on a turbine stator [AIAA PAPER 92-3042] p 822 A92-48703	Experimental study of cross-stream mixing in a	Performance of fuselage pressure structure
[AIAA PAPER 92-3042] p 822 A92-48703 Airfoil wake and linear theory gust response including	rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735	p 913 N92-30109 Fracture mechanics research at NASA related to the
sub and superresonant flow conditions	STRESS ANALYSIS	aging commercial transport fleet p 913 N92-30110
[AIAA PAPER 92-3074] p 823 A92-48724	Linear analysis of naturally curved and twisted	Current DOT research on the effect of multiple site
STEADY FLOW A nonlinear relaxation/quasi-Newton algorithm for the	anisotropic beam p 899 A92-46936	damage on structural integrity p 913 N92-30112
compressible Navier-Stokes equations	Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-28426	Damage tolerance for commuter aircraft p 914 N92-30114
[AIAA PAPER 92-2643] p 796 A92-45510	Generation of spectra and stress histories for fatigue	Thermal QNDE detection of airframe disbonds
Visualization of stopping flow over airfoils	and damage tolerance analysis of fuselage repairs	p 914 N92-30118
[AIAA PAPER 92-2730] p 804 A92-45564 Some exact and numerical results for plane steady	[AD-A250390] p 854 N92-29180 STRESS DISTRIBUTION	A manufacturer's approach to ensure long term
sheared flow of an incompressible inviscid fluid	Combined load test apparatus for flat panels	structural integrity p 838 N92-30133 STRUCTURAL RELIABILITY
p 821 A92-48019	[NASA-CASE-LAR-14698-1] p 911 N92-30028	Reliability centered maintenance for metallic airframes
Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790	Damaged stiffened shell research at NASA. Langley Research Center p 914 N92-30115	based on a stochastic crack growth approach
STEADY STATE	Research Center p 914 N92-30115 STRESS MEASUREMENT	p 897 A92-45242
A fast, implicit unstructured-mesh Euler method	RTOK elimination with TSMM Rerurn Tested OK	Optimal maintenance program of damage tolerance
[AIAA PAPER 92-2693] p 917 A92-45589 Engine performance and health monitoring models using	reproduction using time stress measurement module	structure p 785 A92-47660 A failure analysis for landing gear structural system
steady state and transient prediction methods	p 902 A92-48446 STRUCTURAL ANALYSIS	p 849 A92-47667
p 870 N92-28467	Integrated Design Analysis and Optimisation of Aircraft	Current DOT research on the effect of multiple site
STEELS	Structures	damage on structural integrity p 913 N92-30112
Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-28426	[AGARD-LS-186] p 851 N92-28469 Fundamentals of structural optimisation	STRUCTURAL VIBRATION The relationship between mode localization and operationship between mode localizationship between mode locali
STOCHASTIC PROCESSES	p 851 N92-28470	The relationship between mode localization and energy transmission parameters in the vibration of coupled
Reliability centered maintenance for metallic airframes	Structural optimization of aircraft p 851 N92-28472	structures p 925 A92-45921
based on a stochastic crack growth approach	Multidisciplinary design and optimization	Sonic fatigue analysis and anti-sonic fatigue design of
p 897 A92-45242 STORAGE TANKS	[AGARD-PAPER-2] p 851 N92-28473 Damaged stiffened shell research at NASA, Langley	aircraft structure p 848 A92-47666
Replacement of the NAL high pressure air storage	Research Center p 914 N92-30115	Aero mechanics in the twenty-first century [AIAA PAPER 92-3194] p 863 A92-48805
system	Nonlinear analyses of composite aerospace structures	STRUCTURAL WEIGHT
[NAL-TM-634] p 888 N92-28835 STOVL AIRCRAFT	in sonic fatigue (NASA-CR-190565) p 854 N92-30209	MassInfo - An intelligent mass properties information
International Powered Lift Conference, London,	STRUCTURAL DESIGN	system p 928 A92-47628
England, Aug, 29-31, 1990, Proceedings	The fatigue scatter factors and reduction factors in the	The effect of composite material allowable changes on
[ISBN 0-903409-68-2] p 783 A92-45302 Current technology propulsion systems meet the STOVL	design of aircraft and helicopter's structural lives	VTOL airframe weights p 848 A92-47629 STRUTS
window of opportunity p 860 A92-45307	[SAE PAPER 911984] p 843 A92-45387 Aero-structural integrated design of forward swept	Application of non-reflecting boundary conditions to
ASTOVL flexibility in the 21st century	wing	three-dimensional Euler equation calculations for thick
p 783 A92-45309	[SAE PAPER 912021] p 790 A92-45414	Strut cascades
A USAF assessment of STOVL fighter options p 842 A92-45310	Integrated aeroservoelastic wing synthesis by nonlinear	[AIAA PAPER 92-3045] p 822 A92-48705 SUBCRITICAL FLOW
ASTOVL propulsion systems configuration and concept	programming/approximation concepts p 873 A92-46752	Prediction of the viscous transonic aerodynamic
choice p 842 A92-45312	Approach for analysis and design of composite rotor	performance of supercritical aerofoil sections
Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313	blades p 899 A92-46801	[AIAA PAPER 92-2653] p 805 A92-45569
Hot gas ingestion characteristics and flow visualization	Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188	SUBMERGED BODIES Heat transfer to a cylinder submerged in a rectangular
of a vectored thrust STOVL concept	Design and use of aramid fiber in aircraft structures	cavity in supersonic flow to simulate electrical cables
p 860 A92-45316	p 784 A92-47407	routed through Space Shuttle Solid Rocket Booster
Hot-gas reingestion - Engine response considerations p 860 A92-45317	Design of helicopter composite structures for crashworthiness p 848 A92-47408	External Tank [AIAA PAPER 92-2949] p 901 A92-47913

SUBSONIC AIRCRAFT	Results and lessons learned from the STOL and	An improved approach for the computation of
The impact of CFD on the airplane design process -	Maneuver Demonstration Program	transonic/supersonic flows with applications to aerospace
Today and tomorrow [SAE PAPER 911989] p 788 A92-45391	[SAE PAPER 912005] p 843 A92-45406 Computational study of transition front on a swept wing	configurations [AIAA PAPER 92-2613] p 793 A92-45487
Wing mass formula for subsonic aircraft	leading-edge model	Numerical study on a supersonic open cavity flow with
p 845 A92-46812	[AIAA PAPER 92-2630] p 795 A92-45502	geometric modification of aft bulkhead
Design and off-design point characteristics of Separated	Determination of aerodynamic sensitivity coefficients based on the three-dimensional full potential equation	[AIAA PAPER 92-2627] p 794 A92-45499
Core Ultra High Bypass Engine (SCUBE) LAIAA PAPER 92-37761 p 867 A92-49120	[AIAA PAPER 92-2670] p 798 A92-45525	Unsteady Navier-Stokes simulations of supersonic flow over a three-dimensional cavity
[AIAA PAPER 92-3776] p 867 A92-49120 SUBSONIC FLOW	Viscous flow past a nacelle isolated and in proximity	[AIAA PAPER 92-2632] p 795 A92-45504
On the measurement of subsonic flow around an	of a flat plate	Investigation of solution operators for the
appended body of revolution at cryogenic conditions in	[AIAA PAPER 92-2723] p 803 A92-45560 Aviation, motor, and space designs research and	three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522
the NTF p 880 A92-45265	development in U.S.S.R. p 784 A92-46202	Comparison of interferometric measurements with 3-D
Numerical investigation into high-angle-of-attack leading-edge vortex flow	Prediction of inviscid supersonic/hypersonic aircraft	Euler computations for circular cones in supersonic flow
[AIAA PAPER 92-2600] p 791 A92-45477	flowfields p 810 A92-46785 Determination of aerodynamic sensitivity coefficients for	[AIAA PAPER 92-2691] p 800 A92-45538
Two-point optimization of complete three-dimensional	wings in transonic flow	LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection
airplane configuration	[NASA-CR-190570] p 832 N92-29657	[AIAA PAPER 92-2692] p 800 A92-45539
[AIAA PAPER 92-2618] p 844 A92-45491 The subsonic and transonic flow around the leading edge	SUPERSONIC BOUNDARY LAYERS	A transonic/supersonic/hypersonic CFD analysis of the
of a thin airfoil with a parabolic nose	Computational study of transition front on a swept wing leading-edge model	entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571
[AIAA PAPER 92-2649] p 797 A92-45516	[AIAA PAPER 92-2630] p 795 A92-45502	Comment on 'Canard-wing interaction in unsteady
Investigation of solution operators for the	Discrete modes and continuous spectra in supersonic	supersonic flow' p 812 A92-46820
three-dimensional Euler equations	boundary layers p 809 A92-46264	Two-stream, supersonic, wake flowfield behind a thick
[AIAA PAPER 92-2666] p 797 A92-45522 Calculation of high speed base flows	Effect of a fan of rarefaction waves on the development of disturbances in a supersonic boundary layer	base. I - General features p 813 A92-46895 Calculation of the aerodynamic derivatives of aircraft
[AIAA PAPER 92-2679] p 799 A92-45531	p 809 A92-46519	in the supersonic region using the Mach box method
Effect of a bulge on the subharmonic instability of	SUPERSONIC COMBUSTION	p 875 A92-47779
subsonic boundary layers p 898 A92-45833	Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431	Heat transfer to a cylinder submerged in a rectangular
Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695	Laser-initiated conical detonation wave for supersonic	cavity in supersonic flow to simulate electrical cables routed through Space Shuttle Solid Rocket Booster
Total losses in turbulent flows inside conical diffusers	combustion. III	External Tank
p 819 A92-47782	[AIAA PAPER 92-3247] p 893 A92-48846	[AIAA PAPER 92-2949] p 901 A92-47913
Evaluation of measured-boundary-condition methods for 3D subsonic wall interference	KrF laser-induced OH fluorescence imaging in a supersonic combustion tunnel	A higher-order accurate Navier-Stokes solver for transonic and supersonic flows in turbomachinery
INLR-TR-88072-U1 p 832 N92-29884	[AIAA PAPER 92-3346] p 905 A92-48923	[AIAA PAPER 92-3044] p 822 A92-48704
Production of periodical Mach number variations in high	Experimental investigation of liquid carbonhydrogen fuel	Effect of walls on the supersonic reacting mixing layer
subsonic flow in a blow down wind tunnel, and its influence	combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986	p 912 N92-30065
on profile measurements [ETN-92-91492] p 833 N92-29889	Ignition delays, heats of combustion, and reaction rates	SUPERSONIC INLETS An experimental investigation on aft bypass supersonic
SUBSONIC SPEED	of aluminum alkyl derivatives used as ignition and	inlet performance at high angle of attack and yaw
Experimental studies on aerodynamic characteristics of	combustion enhancers for supersonic combustors	p 862 A92-48268
SSTO vehicle at low subsonic speeds ISAE PAPER 9119811 p 788 A92-45386	[AIAA PAPER 92-3841] p 894 A92-49134 SUPERSONIC COMBUSTION RAMJET ENGINES	A fast, uncoupled, compressible, two-dimensional,
[SAE PAPER 911981] p 788 A92-45386 Comparison between two 3D-NS-codes and experiment	Aerospace plane hydrogen scramjet boosting	unsteady boundary layer algorithm with separation for engine inlets
on a turbine stator	[SAE PAPER 912071] p 891 A92-45451	[AIAA PAPER 92-3082] p 823 A92-48729
[AIAA PAPER 92-3042] p 822 A92-48703	Internal shock interactions in propulsion/airframe	Interface of an uncoupled boundary layer algorithm with
Development of high performance compressor discharge seal	integrated three-dimensional sidewall compression scramjet inlets	an inviscid core flow algorithm for unsteady supersonic engine intets
[AIAA PAPER 92-3714] p 907 A92-49096	[AIAA PAPER 92-3099] p 824 A92-48741	[AIAA PAPER 92-3083] p 823 A92-48730
Subsonic flight test evaluation of a performance seeking	FNS analysis of an axisymmetric scramjet inlet	Numerical simulation of a confined transonic normal
control algorithm on an F-15 airplane	[AIAA PAPER 92-3100] p 824 A92-48742 Operating characteristics at Mach 4 of an inlet having	shock wave/turbulent boundary layer interaction
[AIAA PAPER 92-3743] p 878 A92-49109 Jet aircraft noise at high subsonic flight Mach	forward-swept, sidewall-compression surfaces	[AIAA PAPER 92-3668] p 826 A92-49088 SUPERSONIC JET FLOW
numbers	[AIAA PAPER 92-3101] p 863 A92-48743	Numerical simulation of a supersonic jet impingement
[DLR-FB-91-28] p 928 N92-29997	Computational analysis of ramjet engine inlet interaction	on a ground
SUBSONIC WIND TUNNELS Calculation of support interferences on the aerodynamic	[AIAA PAPER 92-3102] p 824 A92-48744	[SAE PAPER 912014] p 789 A92-45412 The flip flop nozzle extended to supersonic flows
coefficients for a wind tunnel calibration model	A comparative study of scramjet injection strategies for	[AIAA PAPER 92-2724] p 803 A92-45561
[ESA-TT-1247] p 830 N92-29159	high Mach numbers flows	Relationship between the instability waves and noise
SUCTION Compressible Navier-Stokes solutions for a suction	[AIAA PAPER 92-3287] p 904 A92-48876 A scramjet nozzle experiment with hypersonic external	of high-speed jets p 924 A92-45835 The enhancement of mixing in high-speed heated jets
boundary control airfoil	flow	using a counterflowing nozzle
[AIAA PAPER 92-2710] p 802 A92-45551	[AIAA PAPER 92-3289] p 864 A92-48878	[AIAA PAPER 92-3262] p 825 A92-48857
SULFURIC ACID	Experimental validation of scramjet nozzle performance	Supersonic jet mixing enhancement by 'delta-tabs'
Non-chromated anodize process for corrosion resistance and adhesive bonding p 892 A92-47341	[AIAA PAPER 92-3290] p 864 A92-48879	[AiAA PAPER 92-3548] p 826 A92-49063 SUPERSONIC NOZZLES
SUPERCONDUCTING MAGNETS	Analysis of a hydrocarbon scramjet with augmented	Gortler instability and supersonic quiet nozzle design
Superconducting bearings with levitation control	preburning (AIAA PAPER 92-3425) p 865 A92-48984	p 813 A92-46902
configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099	Experimental investigation of liquid carbonhydrogen fuel	Experimental validation of scramjet nozzle performance
SUPERCONDUCTIVITY	combustion in channel at supersonic velocities	[AIAA PAPER 92-3290] p 864 A92-48879
Superconducting bearings with levitation control	[AIAA PAPER 92-3429] p 894 A92-48986	SUPERSONIC SPEED
configurations	The External Propulsion Accelerator - Scramjet thrust	The flip flop nozzle extended to supersonic flows [AIAA PAPER 92-2724] p 803 A92-45561
[NASA-CASE-GSC-13346-1] p 909 N92-29099 SUPERCOOLING	without interaction with accelerator barrel [AIAA PAPER 92-3717] p 866 A92-49098	[AIAA PAPER 92-2724] p 803 A92-45561 Aerodynamically blunt and sharp bodies
Remote measurements of supercooled integrated liquid	SUPERSONIC DIFFUSERS	[AIAA PAPER 92-2727] p 808 A92-45597
water during WISP/FAA aircraft icing program	A time marching method in finite volume for transonic	Aerothermal ablation behavior of selected candidate
p 915 A92-46788 SUPERCRITICAL AIRFOILS	diffuser turbulent flows p 819 A92-47690	external insulation materials [AIAA-PAPER 92-3056] p 893 A92-48714
Development and validation of a characteristic boundary	SUPERSONIC DRAG	SUPERSONIC TRANSPORTS
condition for a cell-centered Euler method	Minimizing supersonic wave drag with physical constraints at design and off-design Mach numbers	Experimental and numerical study of aerodynamic
[NLR-TP-90144-U] p 828 N92-28692	p 811 A92-46808	characteristics for second generation SST
SUPERCRITICAL FLOW Prediction of the viscous transonic aerodynamic	SUPERSONIC FLIGHT	[SAE PAPER 912056] p 844 A92-45439 Effects of wing planform on HSCT off-design
performance of supercritical aerofoil sections	Evolution of ASTOVL aircraft design	aerodynamics High Speed Civil Transport
[AIAA PAPER 92-2653] p 805 A92-45569	p 842 A92-45311 ASTOVL propulsion systems configuration and concept	[AIAA PAPER 92-2629] p 844 A92-45501
A compact higher order Euler solver for unstructured grids with curved boundaries	choice propulsion systems configuration and concept	Introduction propulsion system performance for hypersonic vehicles p 862 A92-46427
[AIAA PAPER 92-2696] p 807 A92-45590	Waves and thermodynamics in high Mach number	Full Navier-Stokes analysis of a two-dimensional
SUPERSONIC AIRCRAFT	propulsive ducts p 809 A92-46431	mixer/ejector nozzte for noise suppression
Large-scale wind tunnel studies of a jet-engined powered	SUPERSONIC FLOW Response characteristics of a wing in supersonic flow	[NASA-TM-105715] p 868 N92-28419
ejector-lift STOVL aircraft p 842 A92-45313 Integrated flight/propulsion control for supersonic	Response characteristics of a wing in supersonic flow near flutter boundary	Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing
STOVL aircraft p 872 A92-45320	[SAE PAPER 911999] p 789 A92-45401	[NASA-TM-107586] p 850 N92-28435

Evaluation of outdoor-to-indoor response to minimized Flow over a twin-tailed aircraft at angle of attack. II sonic booms Temporal characteristics p 810 A92-46781 INASA-CR-1896431 p 927 N92-28556 TABS (CONTROL SURFACES) Navier-Stokes computations on swept-tapered wings. Methods for direct simulation of transition in hypersonic Supersonic jet mixing enhancement by delta-tabs' IAIAA PAPER 92-3548 I p 826 A92-49063 p 810 A92-46786 including flexibility boundary layers 2 SUPERSONIC TURBINES p 912 N92-30064 p 826 A92-49063 The calculation of three-dimensional compressible TAIL ASSEMBLIES boundary layer stability on swept wings The application of particle image velocimetry (PIV) in a Numerical investigation of tail buffet on F-18 aircraft p 818 A92-47684 p 798 A92-45528 I AIAA PAPER 92-2673 | short-duration transonic annular turbine cascade Natural flow wing [ASME PAPER 91-GT-221] p 899 A92-46825 Unsteady pressure and load measurements on an Experience with the Johnson-King turbulence model in INASA-CASE-LAR-14281-11 p 829 N92-28729 F/A-18 vertical fin at high-angle-of-attack p 798 A92-45529 | AIAA PAPER 92-2675 | p 798 A92-45529 Flow over a twin-tailed aircraft at angle of attack. II a transonic turbine cascade flow solver SWEPTBACK WINGS p 821 A92-48207 Aerodynamic heating in three-dimensional shock wave Vane-blade interaction in a transonic turbine. I -Temporal characteristics p 810 A92-46781 turbulent boundary layer interaction induced by sweptback Aerodynamics TAKEOFF sharp fins in hypersonic flows I AIAA PAPER 92-3323 | p 825 A92-48906 Operational evaluation of a tower workstation for ISAE PAPER 9120441 n 791 A92-45428 SUPERSONIC WIND TUNNELS clearance delivery p 879 A92-44981 SWIRLING problems, Gortler instability and supersonic quiet nozzle design Rejected takeoffs - Causes, Swirl number effects on confined flows in a model of p 813 A92-46902 consequences p 835 A92-45052 p 896 A92-45202 a dump combustor Operating characteristics at Mach 4 of an inlet having On the possibility of freezing and sticking phenomena New method of swirl control in a diffusing S-duct forward-swept, sidewall-compression surfaces in a transport during the ground taxiing and takeoff run p 809 A92-45859 I AIAA PAPER 92-3101 I p 863 A92-48743 and on the preventions of the hazard Air ejector experiments using the two-dimensional A new vane swirler as applied to dual-inlet side-dump p 836 A92-45426 supersonic cascade tunnel: Zero secondary flow combustor TANKS (CONTAINERS) [AIAA PAPER 92-3654] p 906 A92-49085 Demonstration of gas liquid separation under the performance microgravity by aircraft KC-135 INAL-TM-6321 p 887 N92-28829 SYMBOLS Shock enhancement and control of hypersonic ISAF PAPER 9120241 p 897 A92-45416 The standardization of military head-up display TARGET ACQUISITION combustion symbology p 855 A92-44929 (AD-A248558) p 896 N92-29580 Identifying design requirements using integrated analysis SYNTHETIC APERTURE RADAR p 922 A92-48527 SUPPORT INTERFERENCE Structures Airborne/shipborne PSK telemetry data link Calculation of support interferences on the aerodynamic TASK COMPLEXITY p 839 A92-47511 coefficients for a wind tunnel calibration model Knowledge-sensitive task manipulation - Acquiring Motion errors in an airborne synthetic aperture radar p 830 N92-29159 IESA-TT-12471 knowledge from pilots flying a motion-based flight p 840 A92-48416 SUPPORT SYSTEMS system simulator p 916 A92-45064 SYSTEM FAILURES The role of simulation for the study of APIS (piloting p 885 N92-28544 The propulsive-only flight control problem support by synthetic imagery) On the possibility of freezing and sticking phenomena Tasking and communication flows in the F/A-18D p 876 A92-48487 in a transport during the ground taxiing and takeoff run F-16 failure detection isolation and estimation study cockpit: Issues, problems, and possible solutions and on the preventions of the hazard p 853 N92-28802 p 876 A92-48490 p 836 A92-45426 IAD-A2459771 ISAE PAPER 9120421 SURFACE CRACKS TAYLOR INSTABILITY SYSTEM IDENTIFICATION Magnetic particle testing of turbine blades mounted on The DAM vertical shock-tube The role of systems simulation for the development and p 880 A92-45096 p 898 A92-46498 qualification of ATTAS TAYLOR SERIES the turbine rotor shaft p 886 N92-28548 SURFACE GEOMETRY A fast three-dimensional vortex method for unsteady SYSTEMS ENGINEERING Surface grid generation in a parameter space wake calculations Applying advanced digital simulation techniques in p 803 A92-45556 [AIAA PAPER 92-2624] p 794 A92-45496 p 921 A92-48489 designing fault tolerant systems SURFACE ROUGHNESS Taylor series approximation of geometric shape variation Emerging airframe/propulsion integration technologies A methodology for the evaluation of runway roughness for the Euler equations p 899 A92-46916 General Electric TECHNOLOGICAL FORECASTING for repair [AIAA PAPER 92-3335] p 850 A92-48917 [AD-A250407] p 887 N92-28772 ASTOVL flexibility in the 21st century Engine aircraft systems integration course [AIAA PAPER 92-3762] p 928 SURFACE ROUGHNESS EFFECTS p 783 A92-45309 p 928 A92-49117 **TECHNOLOGIES** Aerodynamic characteristics of hoar frost roughness Integrated Design Analysis and Optimisation of Aircraft p 808 A92-45829 Composites in manufacturing - Case studies SURFACE TEMPERATURE USBN 0-87263-406-X1 p 784 A92-47403 [AGARD-LS-186] p 851 N92-28469 TECHNOLOGY ASSESSMENT Second-order shock-expansion theory extended to Multidisciplinary design and optimization [AGARD-PAPER-2] p 85 include real gas effects Piloted simulation effectiveness development p 851 N92-28473 [AD-A247191] p 831 N92-29539 applications and limitations p 883 N92-28524 Design specifications for the Advanced Instructional Saenger: The reference concept and its technological Hypersonic flow past radiation-cooled surfaces MBB-FE-202-S-PUB-0468-A) Design Advisor (AIDA), volume 2 p 832 N92-29713 requirements - aerothermodynamics IAD-A2482021 p 923 N92-29188 SURFACE TO AIR MISSILES IMBB-FE-202-S-PUB-0463-A1 p 890 N92-29629 Propulsion systems from takeoff to high-speed flight Nondestructive inspection perspectives Development of a flight information system using the p 889 A92-46428 structured method p 915 N92-30121 SURFACE TREATMENT p 859 N92-29222 Current and future developments in civil aircraft [AD-A248207] Anodize and prime your aluminum without environmental non-destructive evaluation from an operator's point of SYSTEMS INTEGRATION p 892 A92-47340 p 787 N92-30122 Integrated flight/propulsion control for supersonic **TECHNOLOGY TRANSFER** SURFACTANTS STOVL aircraft p 872 A92-45320 Enhancing the performance characteristics of engine Communication: An important element of maintenance Aero-structural integrated design of forward swept and repair p 838 N92-30124 fuels by means of surfactant additives TELECOMMUNICATION p 892 A92-46631 (SAF PAPER 912021) n 790 A92-45414 SURGES Airborne/shipborne PSK telemetry data link A geometry-integrated approach to multiblock grid p 839 A92-47511 Numerical investigation of surge and rotating stall in p 919 A92-47083 generation multistage axial compressors Tasking and communication flows in the F/A-18D Modern techniques for monitoring airborne telemetry [AIAA PAPER 92-3193] p 825 A92-48804 cockpit: Issues, problems, and possible solutions p 857 A92-47560 [AD-A245977] Dynamic control of aerodynamic instabilities in gas p 853 N92-28802 p 870 N92-28466 Modular avionics - A commercial perspective turbine engines **TELEMETRY** p 858 A92-48427 SWEEP EFFECT Internationalization of telemetry systems Operating characteristics at Mach 4 of an inlet having Rapid systems integration of navigation avionics p 920 A92-47535 p 858 A92-48473 forward-swept, sidewall-compression surfaces Airborne Data Acquisition and Relay System [AIAA PAPER 92-3101] p 863 A92-48743 Using design of experiments to improve product and p 839 A92-47574 SWEPT WINGS process integrity p 928 A92-48555 Stability and control flight testing of a half-scale Pioneer Aero-structural integrated design of forward swept Inlet distortion effects in aircraft propulsion system remotely piloted vehicle p 869 N92-28464 integration IAD-A2459731 p 879 N92-28801 ISAF PAPER 9120211 p 790 A92-45414 SYSTEMS MANAGEMENT **TELEVISION CAMERAS** Computational study of transition front on a swept wing Integrated wiring system A high-performance LLLTV CCD camera for nighttime [SAE PAPER 912058] p 897 A92-45440 pilotage p 855 A92-46227 (AIAA PAPER 92-2630) n 795 A92-45502 SYSTEMS SIMULATION TEMPERATURE CONTROL Laminar separation bubbles and airfoil design at low Putting the control back in air traffic control - An Active thermal isolation for temperature responsive Reynolds numbers enhanced Universal Development Simulation System [AIAA PAPER 92-2735] p 797 A92-45515 p 916 A92-44982 [NASA-CASE-LAR-14612-1] Prediction of laminar boundary layer using cubic p 911 N92-29954 Analysis of the VISTA longitudinal simulation capability TEMPERATURE DEPENDENCE p 876 A92-48488 [AIAA PAPER 92-2702] for a cruise flight condition The optimization of variable cross-section spines with n 801 A92-45544 F-16 failure detection isolation and estimation study Concepts for the stability analysis of NLF-experiments temperature dependent thermal parameters p 876 A92-48490 p 901 A92-48353 IAIAA PAPER 92-27061 Harrier GR MK 5/7 mission simulators for the Royal o 801 A92-45548 **TEMPERATURE EFFECTS** p 885 N92-28540 Forebody vortex control for suppressing wing rock on Air Force

The role of systems simulation for the development and

qualification of ATTAS

p 886 N92-28548

Experimental and computational ice shapes and

p 828 N92-28674

resulting drag increase for a NACA 0012 airfoil

[NASA-TM-105743]

a highly-swept wing configuration

p 803 A92-45555

I AIAA PAPER 92-27161

SUBJECT INDEX Thermal response of rigid and flexible insulations and Ablation performance characterization of thermal reflective coating in an aeroconvective heating rotection materials using a Mach 4.4 Sled Test p 893 A92-48713 environment AIAA PAPER 92-30551 [AIAA PAPER 92-2609] Aerothermal ablation behavior of selected candidate p 852 N92-28721 INASA-TM-1039251 external insulation materials Effect of walls on the supersonic reacting mixing layer p 893 A92-48714 aerodynamic configurations p 912 N92-30065 LAIAA PAPER 92-30561 Thermal response of rigid and flexible insulations and I AIAA PAPER 92-2619 | TEMPERATURE MEASUREMENT reflective coating in an aeroconvective heating Lubricant evaluation and performance 2 p 895 N92-28398 environment wake calculations [NASA-TM-103925] p 852 N92-28721 TEMPERATURE PROFILES | AIAA PAPER 92-2624 | THERMAL SHOCK Microwave temperature profiler for clear air turbulence Paint removal using cryogenic processes IAD-A2476681 p 895 N92-28912 INASA-CASE-NPO-18115-1-CUI p 916 N92-29148 THERMAL STRESSES **TEMPERATURE SENSORS** Numerical analysis of an engine turbine disk loaded with Active thermal isolation for temperature responsive a large number of thermomechanical cycles [AIAA PAPER 92-2666] p 902 A92-48592 INASA-CASE-LAR-14612-11 [ONERA, TP NO. 1992-31] p 911 N92-29954 TENSILE PROPERTIES THERMOCHEMISTRY flows Analysis of thermo-chemical nonequilibrium models for Tensile and interlaminar properties of GLARE (trade [AIAA PAPER 92-2668] carbon dioxide flows
[AIAA PAPER 92-2852] name) laminates p 895 N92-28921 p 892 A92-47835 AD-A2501881 3D viscous flow about a re-entry vehicle THERMODYNAMIC CYCLES TENSILE STRENGTH [AIAA PAPER 92-2685] The relationship between tensile and flexural strength Turboshaft/turboprop cycle sensitivity analysis of unidirectional composites p 891 A92-45629 I AIAA PAPER 92-34761 p 865 A92-49020 Practical considerations in designing the engine cycle TENSION p 869 N92-28460 [AIAA PAPER 92-2689] Apparatus for elevated temperature compression or THERMODYNAMIC EFFICIENCY tension testing of specimens INASA-CASE-LAR-14775-11 Restart of theory of air-breathing engines [AIAA PAPER 92-3472] p 906 p 912 N92-30099 p 906 A92-49018 TERMINAL FACILITIES THERMODYNAMIC PROPERTIES FAA aviation forecasts Heat transfer characteristics of hypersonic waveriders p 837 N92-29182 IAD-A2504121 waverider with an emphasis on leading edge effects [AIAA PAPER 92-2726] TERMINAL VELOCITY [AIAA PAPER 92-2920] p 821 A92-47892 Stability and inherent precision of two methods for Characterization of thermal performance of wheel solving motion and ablation equations for fireball-forming centrifugal impeller p 849 A92-48352 outboard of an aircraft p 929 A92-46595 bodies in the earth atmosphere THERMODYNAMICS TERRAIN ANALYSIS Design and implementation of a generic Kalman filter Steady and transient performance calculation method p 858 A92-48475 for prediction, analysis, and identification in Ada p 869 N92-28461 **TEST CHAMBERS** The design of test-section inserts for higher speed aeroacoustic testing in the Ames 80- by 120-foot wind THERMOGRAPHY Indirect measurements of convective flow by IR thermography [ONERA, TP NO. 1992-46] [NASA-TM-103915] p 927 N92-28909 p 902 A92-48607 Thermal QNDE detection of airframe disbonds TEST FACILITIES p 914 N92-30118 p 880 A92-45266 aerodynamic analysis Water tunnels Computation of 3-D hypersonic flows in chemical high-Reynolds-number THERMOPLASTIC RESINS Remarks on turbulence Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of experiments and facilities p 881 A92-45267 [AIAA PAPER 92-2876] p 820 A92-47858 Calculation of fully three-dimensional separated flows Recent developments at the Shoeburyness STOVL test thermoplastic composites as candidate material facility p 881 A92-45314 p 843 A92-45437 [SAE PAPER 912053] Ground surface erosion - British Aerospace test facility THICKNESS [ONERA, TP NO. 1992-1] p 821 A92-48 Separation and vortex formation in turbulent flows and experimental studies p 881 A92-45323 Simple effective thickness model for circular brush Making fly-by-light a reality p 877 A92-48499 TEST FIRING واومو [ONERA, TP NO. 1992-7] p 822 A92-48579 [AIAA PAPER 92-3192] High spatial resolution measurements of ram accelerator p 903 A92-48803 gas dynamic phenomena [AIAA PAPER 92-3244] Scenario analysis of thigh gap related ejection injuries p 903 A92-48844 strut cascades p 834 A92-44995 TEST PILOTS [AIAA PAPER 92-3045] Use of simulation in the USAF Test Pilot School THIN AIRFOILS p 884 N92-28535 The subsonic and transonic flow around the leading edge curriculum of a thin airfoil with a parabolic nose **TEST RANGES** scramiet inlets p 797 A92-45516 p 882 A92-47562 [AIAA PAPER 92-2649] [AIAA PAPER 92-3099] Remote telemetry concepts Thin-airfoil correction for panel methods TEST STANDS p 811 A92-46811 Experience in the operation of a hypersonic nozzle static

thrust stand [AIAA PAPER 92-3292] p 882 A92-48881

THERMAL ANALYSIS The optimization of variable cross-section spines with

temperature dependent thermal parameters p 901 A92-48353

The effect of tip convection on the performance and optimum dimensions of cooling fins p 902 A92-48354 Lubricant evaluation and performance 2

p 895 N92-28398 [AD-A247464] Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721

THERMAL ENVIRONMENTS

Performance of uncoated AFRSI blankets during multiple Space Shuttle flights

[NASA-TM-103892] p 890 N92-29104 THERMAL FATIGUE

Elevated temperature crack growth in aircraft engine p 891 A92-45234

THERMAL INSULATION

Study of grinding process and strength for ceramic heat ISME PAPER MR91-1771 p 897 A92-45260

Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721

THERMAL PROTECTION Ablative control mechanism in nozzle thermo-protection p 889 A92-48712 [AIAA PAPER 92-3054]

p 818 A92-47100 (lifting surface method) Buckling, postbuckling and crippling of thin walled

composite airframe structures under compression p 899 A92-46940

Analysis of motion of airfoil flying over wavy-wall surface

THREE DIMENSIONAL BODIES Prismatic grid generation with an efficient algebraic

method for aircraft configurations [AIAA PAPER 92-2721]
Computations of hypersonic p 803 A92-45559 flows around a three-dimensional concave/convex body 1AIAA PAPER 92-26061 p 805 A92-45570

THREE DIMENSIONAL BOUNDARY LAYER

Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows **ISAE PAPER 9120441** p 791 A92-45428

Concepts for the stability analysis of NLF-experiments on swept wings

[AIAA PAPER 92-2706] p 801 A92-45548 The inviscid compressible Goertler problem in three-dimensional boundary layers p 809 A92-46441 The calculation of three-dimensional compressible

boundary layer stability on swept wings p 818 A92-47684

THREE DIMENSIONAL FLOW

THIN BODIES

An economic approach to accurate wing design ISAE PAPER 9120081 p 789 A92-45408 Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 Navier-Stokes and Euler solutions for an unmanned p 792 A92-45483

The design of a system of codes for industrial calculations of flows around aircraft and other complex

p 917 A92-45492 A fast three-dimensional vortex method for unsteady p 794 A92-45496

Effect of throat contouring on two-dimensional converging-diverging nozzles using URS method [AIAA PAPER 92-2659] p 797 A9: p 797 A92-45520

Investigation of solution operators for the three-dimensional Euler equations

p 797 A92-45522 An unfactored implicit scheme for 3D inviscid transonic

p 798 A92-45523

An adaptive grid method for computing the high speed p 799 A92-45534

LDV measurements in the three-dimensional near wake of a stationary and oscillating rectangular wind

p 799 A92-45536 Comparison of interferometric measurements with 3-D Euler computations for circular cones in supersonic flow [AIAA PAPER 92-2691] p 800 A92-45538

Computation of turbulent flow about cone-derived p 804 A92-45562

Effect of flow rate on loss mechanisms in a backswept p 897 A92-45606 Interaction between crossing oblique shocks and a

turbulent boundary layer p 812 A92-46882

Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886

Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 Three-dimensional blade vortex interactions

p 815 A92-46953 Grid adaptation to multiple functions for applied p 817 A92-47045

non-equilibrium including transport phenomena

ith an unsteady viscous-inviscid interaction method p 821 A92-48577

Application of non-reflecting boundary conditions to three-dimensional Euler equation calculations for thick

p 822 A92-48705 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression

n 824 A92-48741 Development and application of a zonal k-epsilon turbulence model for complex 3-D flowfields

[AIAA PAPER 92-3176] p 903 A92-48792 Navier-Stokes investigation of a transonic centrifugal compressor stage using an algebraic Reynolds stress model

A turbulence model based on RNG for quasi-three-dimensional cascade flows --- renormalization

group methods [AIAA PAPER 92-3312] p 825 A92-48898 Investigation of three-dimensional flow field in a turbine

including rotor/stator interaction. I - Design development and performance of the research facility 1AIAA PAPER 92-33251 p 883 A92-48908

Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. II - Three-dimensional flow field at the exit of the nozzle [AIAA PAPER 92-3326] p 826 A92-48909

Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows p 827 A92-49188

Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction

p 827 N92-28477 Development and validation of a characteristic boundary condition for a cell-centered Euler method

p 828 N92-28692 [NLR-TP-90144-U] Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the

calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 Development of a multigrid transonic potential flow code

for cascades

[NASA-CR-190480] p 830 N92-29361

Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318

An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408

Evaluation of measured-boundary-condition methods for	TIME LAG	Transport delay measurements: Methodology and
3D subsonic wall interference	A distributed vaporization time-lag model for gas turbine	analysis for the F-16C combat engagement trainer, the
[NLR-TR-88072-U] p 832 N92-29884	combustor dynamics	display for advanced research and training, and the F-16A
A method for computing the 3-dimensional flow about wings with leading-edge vortex separation. Part 2:	[AIAA PAPER 92-3465] p 865 A92-49014	limited field of view
Description of computer program VORSEP	Ignition delays, heats of combustion, and reaction rates of aluminum alkyl derivatives used as ignition and	TRAINING SIMULATORS
[NLR-TR-86006-U] p 833 N92-29916	combustion enhancers for supersonic combustors	Full model simulation of the National Airspace System
Explicit Navier-Stokes computation of turbomachinery	[AIAA PAPER 92-3841] p 894 A92-49134	- Research and training platform p 880 A92-45042
flows	A simple and low cost system to measure delay times	Piloted simulation effectiveness development
[AD-A248458] p 911 N92-29933	in pneumatic systems	applications and limitations p 883 N92-28524
THREE DIMENSIONAL MODELS Two-point optimization of complete three-dimensional	[NLR-TP-90174-U] p 859 N92-28644	Experience with piloted simulation in the development of helicopters p 884 N92-28528
airplane configuration	Transport delay measurements: Methodology and	Validation of simulation systems for aircraft acceptance
[AIAA PAPER 92-2618] p 844 A92-45491	analysis for the F-16C combat engagement trainer, the	testing p 852 N92-28531
Transonic airfoil and wing design using Navier-Stokes	display for advanced research and training, and the F-16A	Aircraft simulation and pilot proficiency: From surrogate
codes	limited field of view [AD-A248519] p 888 N92-29505	flying towards effective training p 884 N92-28532
[AIAA PAPER 92-2651] p 797 A92-45518	TIME MARCHING	The use of a dedicated testbed to evaluate simulator
Three-dimensional-mode resonance in far wakes	Temporal adaptive Euler/Navier-Stokes algorithm	training effectiveness p 884 N92-28533
p 898 A92-46252	involving unstructured dynamic meshes	AM-X flight simulator from engineering tool to training device p 884 N92-28536
An unstructured mesh generation algorithm for three-dimensional aeronautical configurations	p 812 A92-46887	device p 884 N92-28536 The evaluation of simulator effectiveness for the training
p 918 A92-47053	A time marching method in finite volume for transonic	of high speed, low level, tactical flight operations
NPSNET: Flight simulation dynamic modeling using	diffuser turbulent flows p 819 A92-47690	p 885 N92-28539
quaternions	TIME OPTIMAL CONTROL	Harrier GR MK 5/7 mission simulators for the Royal
[AD-A247484] p 923 N92-28245	Thrust laws for microburst wind shear penetration	Air Force p 885 N92-28540
THROTTLING	p 873 A92-46750	Results of a flight simulator experiment to establish
The propulsive-only flight control problem	TIME RESPONSE	handling quality guidelines for the design of future transport
p 876 A92-48487	The effect of molecular relaxation processes in air on the rise time of sonic booms p 898 A92-45883	aircraft [NLR-MP-88044-U] p 854 N92-29616
Summary of the effects of engine throttle response on airplane formation-flying qualities	TIME TEMPERATURE PARAMETER	Assessment of army aviators' ability to perform individual
[AIAA PAPER 92-3318] p 877 A92-48902	Lubricant evaluation and performance 2	and collective tasks in the aviation networked simulator
THRUST	[AD-A247464] p 895 N92-28398	[AD-A250293] p 888 N92-29709
Thrust/speed effects on long-term dynamics of	TIRES	TRAJECTORY OPTIMIZATION
aerospace planes p 889 A92-46766	Sensitivity of tire response to variations in material and	Thrust laws for microburst wind shear penetration
Effects of bleed air extraction on thrust levels on the	geometric parameters p 900 A92-47128	p 873 A92-46750
F404-GE-400 turbofan engine [NASA-TM-104247] p 871 N92-29425	TITANIUM ALLOYS	Aircraft route optimization using adaptive simulated annealing p 922 A92-48565
THRUST CHAMBER PRESSURE	Axial alignment of short-fiber titanium aluminide	TRANSDUCERS
An experimental investigation of high-aspect-ratio	composites by directional solidification	Fiber-optic position transducers for aircraft controls
cooling passages	p 892 A92-46838	p 857 A92-48041
[AIAA PAPER 92-3154] p 890 A92-48780	Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958	TRANSFER OF TRAINING
THRUST CHAMBERS	Surface residual stress analysis of metals and alloys	The use of a dedicated testbed to evaluate simulator
An experimental investigation of high-aspect-ratio	[AD-A248372] p 895 N92-28426	training effectiveness p 884 N92-28533
cooling passages [AIAA PAPER 92-3154] p 890 A92-48780	TOLERANCES (MECHANICS)	AM-X flight simulator from engineering tool to training device p 884 N92-28536
THRUST CONTROL	Optimal maintenance program of damage tolerance	Assessment of army aviators' ability to perform individual
Fighter airframe/propulsion integration - A McDonnell	structure p 785 A92-47660	and collective tasks in the aviation networked simulator
Aircraft perspective	Generation of spectra and stress histories for fatigue	[AD-A250293] p 888 N92-29709
[AIAA PAPER 92-3333] p 850 A92-48916	and damage tolerance analysis of fuselage repairs	TRANSIENT RESPONSE
THRUST MEASUREMENT	[AD-A250390] p 854 N92-29180	Electromechanical systems with transient high power
Thrust stand evaluation of engine performance	Aging commuter aeroplanes: Fatigue evaluation and	response operating from a resonant AC link
improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111	control methods p 915 N92-30132 TOLLMIEN-SCHLICHTING WAVES	[NASA-TM-105716] p 870 N92-28985 TRANSITION FLOW
THRUST VECTOR CONTROL	A new approach for the calculation of transitional	A new approach for the calculation of transitional
Harrier international programme p 841 A92-45305	flows	flows
to the second of	[AIAA PAPER 92-2669] p 798 A92-45524	[AIAA PAPER 92-2669] p 798 A92-45524
Maximizing thrust-vectoring control power and adility		
Maximizing thrust-vectoring control power and agility metrics p 874 A92-46794	TOOLING	Numerical method for predicting transition in
	TOOLING Tooling for C-17 composite parts p 900 A92-47412	three-dimensional flows by spatial amplification theory
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS	three-dimensional flows by spatial amplification theory p 812 A92-46886
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring	TOOLING p 900 A92-47412 Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21681-1] p 912 N92-30082	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS)
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using	TOOLING	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg (AIAA PAPER 92-3095) p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263) p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown:	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown:	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airframe/propulsion integration - A General	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3283] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3283] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A24803] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3288] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion?	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic system: p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Heticopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantait transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45568	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3283] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45568 Approach for analysis and design of composite rotor	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantalt transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45688 Approach for analysis and design of composite rotor blades p 492-46801	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136
metrics personal paracteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3288] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45568 Approach for analysis and design of composite rotor blades FILT WING AIRCRAFT	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800 Computation of three-dimensional effects on two dimensional wings	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TRANSONIC COMPRESSORS Wind-tunnel compressor stall monitoring using neural
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airtrame/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 855 A92-45568 Approach for analysis and design of composite rotor blades p 899 A92-46801 TILT WING AIRCRAFT High speed VSTOL on the horizon - The answer to	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800 Computation of three-dimensional effects on two dimensional wings [NASA-CR-190576] p 832 N92-29691	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantall transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105655] p 910 N92-29136 TRANSONIC COMPRESSORS Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45688 Approach for analysis and design of composite rotor blades p 899 A92-46801 TILT WING AIRCRAFT High speed VSTOL on the horizon - The answer to congestion?	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800 Computation of three-dimensional effects on two dimensional wings [NASA-CR-190576] p 832 N92-29691 TRAINING ANALYSIS	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105661] p 910 N92-29136 TRANSONIC COMPRESSORS Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 91-976] p 805 A92-45568 Approach for analysis and design of composite rotor blades p 899 A92-46801 TILT WING AIRCRAFT High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800 Computation of three-dimensional effects on two dimensional wings [NASA-CR-190576] p 832 N92-29691 TRAINING ANALYSIS Assessment of army aviators' ability to perform individual	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantall transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105655] p 910 N92-29136 TRANSONIC COMPRESSORS Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817
metrics p 874 A92-46794 Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Comparative investigation of multiplane thrust vectoring nozzles [AIAA PAPER 92-3263] p 864 A92-48858 Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 Fighter airframe/propulsion integration - A General Dynamics perspective [AIAA PAPER 92-3332] p 850 A92-48915 Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 TILT ROTOR AIRCRAFT The high speed challenge for rotary wing aircraft [SAE PAPER 911974] p 842 A92-45381 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45688 Approach for analysis and design of composite rotor blades p 899 A92-46801 TILT WING AIRCRAFT High speed VSTOL on the horizon - The answer to congestion?	TOOLING Tooling for C-17 composite parts p 900 A92-47412 TOOLS Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 TORQUE Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TOUCHDOWN Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 TRACKING (POSITION) Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 Passive acoustic range estimation of helicopters [AD-A248033] p 926 N92-28302 TRAILING EDGE FLAPS Active control of blade vortex interaction p 814 A92-46944 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 TRAILING EDGES Wake mixing and performance measurements in a linear compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800 Computation of three-dimensional effects on two dimensional wings [NASA-CR-190576] p 832 N92-29691 TRAINING ANALYSIS	three-dimensional flows by spatial amplification theory p 812 A92-46886 TRANSMISSION LOSS Gas turbine exhaust system silencing design p 882 A92-47365 TRANSMISSIONS (MACHINE ELEMENTS) Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 Advanced Rotorcraft Transmission (ART) Program summary [AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component test results [AIAA PAPER 92-3366] p 905 A92-48939 Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 Dynamics of a split torque helicopter transmission [NASA-TM-105681] p 910 N92-29136 TRANSONIC COMPRESSORS Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817 TRANSONIC FLIGHT Aero-structural integrated design of forward swept

Piloted Simulation Effectiveness [AGARD-CP-513]

AGARD-CP-513] p 786 N92-28522

AM-X flight simulator from engineering tool to training levice p 884 N92-28536

TIME DIVISION MULTIPLEXING

Common airborne instrumentation system (CAIS) --time-division multiplexed data acquisition system
p 856 A92-47538

Turbulent spot generation and growth rates in a transonic

Development of a multigrid transonic potential flow code

p 909 N92-29118

p 830 N92-29361

boundary laver

for cascades

[NASA-CR-190480]

aircraft

[NLR-MP-88044-U]

aging commercial transport fleet

p 854 N92-29616

p 913 N92-30110

Fracture mechanics research at NASA related to tha

Status of the FAA flight loads monitoring program p 914 N92-30113

Effect of canard deflection on close-coupled Determination of aerodynamic sensitivity coefficients for Aging aircraft NDI Development and Demonstration canard-wing-body aerodynamics wings in transonic flow (AANC): An overview ---[NASA-CR-190570] p 792 A92-45479 p 832 N92-29657 inspection 1AIAA PAPER 92-26021 p 915 N92-30120 An improved approach for the computation of TRANSONIC SPEED The FAA aging airplane program plan for transport Application of the Euler method EUFLEX to a fighter-type transonic/supersonic flows with applications to aerospace p 838 N92-30128 configurations airplane configuration at transonic speed Transport Canada aging aircraft activities p 845 A92-45573 [AIAA PAPER 92-2613] p 793 A92-45487 | AIAA PAPER 92-2620 | p 838 N92-30131 Experimental investigation of the parallel vortex-airfoil Three-dimensional orthogonal-to-surface structured grid TRAPEZOIDAL WINGS p 813 A92-46901 interaction at transonic speeds generation with transonic Navier-Stokes flow solutions for A LEX blowing technique for post-stall lateral control TRANSONIC WIND TUNNELS a commercial transport configuration [AIAA PAPER 92-2616] of trapezoidal wings On the measurement of subsonic flow around an p 793 A92-45490 IAIAA PAPER 92-2714 I p 802 A92-45553 appended body of revolution at cryogenic conditions in Application of an unstructured Navier-Stokes solver to TRAPPED VORTICES p 880 A92-45265 multi-element airfoils operating at transonic maneuver Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 Calibration-related pseudo-Reynolds number trends in conditions p 796 A92-45508 transonic wind tunnels [AIAA PAPER 92-2638] p 796 A92-45507 TREES (MATHEMATICS) The windtunnel as a tool for laminar flow research The subsonic and transonic flow around the leading edge Mesh adaptivity with the quadtree method p 887 N92-28661 INLR-TP-90145-UI of a thin airfoil with a parabolic nose Replacement of the NAL high pressure air storage p 816 A92-47041 | AIAA PAPER 92-2649| p 797 A92-45516 TRIANGULATION Transonic airfoil and wing design using Navier-Stokes INAL-TM-6341 p 888 N92-28835 Adaptive parallel meshes with complex geometry Buffet test in the National Transonic Facility p 918 A92-47050 [AIAA PAPER 92-2651] p 797 A92-45518 INASA-CR-189595] p 888 N92-29352 TRIBOLOGY Recent CFD applications on jet transport TRANSPARENCE High-temperature miniaturized turbine engine lubrication configurations Fabrication and mechanical properties of an optically system simulator [AIAA PAPER 92-2658] p 844 A92-45519 transparent glass fiber/polymer matrix composite IAD-A2492591 p 868 N92-28294 Investigation of solution operators for p 891 A92-45630 TURBINE BLADES three-dimensional Euler equations TRANSPORT AIRCRAFT An analysis of the effect of centrifugal force on the impact | AIAA PAPER 92-2666 | p 797 A92-45522 Data Link integration in commercial transport perations p 839 A92-44919 resistance of composite fan blades for turbo-fan engines An unfactored implicit scheme for 3D inviscid transonic operations ISAE PAPER 912047] p 861 A92-45431 High speed VSTOL on the horizon - The answer to flows Magnetic particle testing of turbine blades mounted on congestion? [AIAA PAPER 92-2668] p 798 A92-45523 p 898 A92-46498 the turbine rotor shaft Transonic unsteady inviscid and viscous flow's |SAE PAPER 911976| p 843 A92-45383 Advanced superalloys for turbine blade and vane The impact of CFD on the airplane design process simulation around 2-D moving bodies applications p 801 A92-45546 Today and tomorrow [ONERA, TP NO. 1992-2] p 893 A92-48578 Time accurate computation of unsteady transonic flows [SAE PAPER 911989] p 788 A92-45391 Vane-blade interaction in a transonic turbine. II - Heat around an airfoil with oscillating flap on dynamic grid Wind tunnel investigation of an improved upper surface [AIAA PAPER 92-2733] p 805 A92-45567 blown flap transport semi-span model [AIAA PAPER 92-3324] Prediction of the viscous transonic aerodynamic performance of supercritical aerofoil sections p 904 A92-48907 [SAE PAPER 911993] p 789 A92-45395 Avionics flight systems for the 21st century
SAE PAPER 912033] p 784 A92-45421 Failure model development for an integrally bladed p 805 A92-45569 [SAE PAPER 912033] [AIAA PAPER 92-2653] 1AIAA PAPER 92-34201 p 865 A92-48979 Functional mock-up tests for flight control system of the Transonic calculations for wings with deflected control NAL OSTOL research aircraft 'ASKA' Flexible manufacturing in repair of gas turbine engine surfaces p 881 A92-45422 [AIAA PAPER 92-2617] p 805 A92-45572 [SAE PAPER 912036] components | AIAA PAPER 92-3524 | On the possibility of freezing and sticking phenomena p 786 A92-49049 Smooth solutions for transonic gasdynamic equations in a transport during the ground taxiing and takeoff run Russian book Laser anemometer measurements and computations in [ISBN 5-02-029345-8] p 809 A92-46626 and on the preventions of the hazard an annular cascade of high turning core turbine vanes p 836 A92-45426 [SAE PAPER 912042] [NASA-TP-3252] Simulation of transonic flow over twin-jet transport p 830 N92-28980 Three-dimensional orthogonal-to-surface structured grid p 811 A92-46793 Fatigue in single crystal nickel superalloys Design load predictions on a fighter-like aircraft wing generation with transonic Navier-Stokes flow solutions for p 896 N92-29408 I AD-A248190 I a commercial transport configuration Examination of the main error factors with regards to p 811 A92-46797 The application of particle image velocimetry (PIV) in a [AIAA PAPER 92-2616] p 793 A92-45490 secondary losses in compression and turbine cascades The design of a system of codes for industrial calculations of flows around aircraft and other complex short-duration transonic annular turbine cascade by variations of the blade picture ratio LASME PAPER 91-GT-2211 p 899 A92-46825 1FTN-92-914931 p 871 N92-29927 aerodynamic configurations Compact higher order characteristic-based Euler solver TURBINE ENGINES [AIAA PAPER 92-2619] p 917 A92-45492 for unstructured grids p 812 A92-46889 Study of grinding process and strength for ceramic heat Recent CFD applications on jet transport Effect of model cooling on periodic transonic flow insulated engine [SME PAPER MR91-177] p 813 A92-46900 configurations p 897 A92-45260 Numerical simulation of multizone two-dimensional [AIAA PAPER 92-2658] p 844 A92-45519 Integrated optic components for advanced turbine Simulation of transonic flow over twin-jet transport engine control systems p 925 A92-46248 transonic flows using the full Navier-Stokes equations p 811 A92-46793 p 815 A92-46955 Fiber optic speed sensor for advanced gas turbine ngine control p 857 A92-48044 Grid generation and compressible flow computations Mesh adaption for 2D transsonic Euler flows on about a high-speed civil transport configuration unstructured meshes p 816 A92-47038 Indirect measurements of convective flow by IR p 919 A92-47055 Mesh adaptivity with the quadtree method thermography p 816 A92-47041 Interactive algebraic mesh generation for twin jet [ONERA, TP NO. 1992-46] p 902 A92-48607 transport aircraft p 817 A92-47064 Comparison between two 3D-NS-codes and experiment 3-D numerical grid generation for the transonic flow Electric actuation system duty rty cycles --- in p 877 A92-48494 analysis about multi-bodies p 817 A92-47061 on a turbine stator A finite difference solution of the Euler equations on fly-by-wire/power-by-wire control [AIAA PAPER 92-3042] p 822 A92-48703 DYNamic Turbine Engine Compressor Code (DYNTECC) - Theory and capabilities Trends in commercial aircraft design - What evolution non-body-fitted Cartesian grids p 818 A92-47153 factors and what approach? [ONERA, TP NO. 1992-25] Numerical computations of transonic flows through p 786 A92-48587 [AIAA PAPER 92-3190] p 923 A92-48802 Investigations of propulsion integration interference [AIAA PAPER 92-3041] p 822 A92-48702 Naval aircraft/engine mission payoff analyses |AIAA PAPER 92-3473| p 865 A92-49019 A higher-order accurate Navier-Stokes solver for effects on a transport aircraft configuration [AIAA PAPER 92-3097] p 849 p 849 A92-48739 Intelligent Engine Control (IEC) transonic and supersonic flows in turbomachinery IAIAA PAPER 92-30441 p 822 A92-48704 Use of a virtual cockpit for the development of a future LAIAA PAPER 92-3484 I p.866 A92-49024 p 886 N92-28547 Navier-Stokes investigation of a transonic centrifugal transport aircraft High-temperature miniaturized turbine engine lubrication The use and effectiveness of piloted simulation in compressor stage using an algebraic Reynolds stress system simulator transport aircraft research and development model LAD-A2492591 p 868 N92-28294 p 886 N92-28549 [AIAA PAPER 92-3311] Contingency power for a small turboshaft engine by using p 825 A92-48897 Hyperbolic grid generation with BEM source terms water injection into turbine cooling air Calculation of unsteady transonic flows with mild [NLR-TP-90334-U] p 923 N92-28635 Some longitudinal handling qualities design guidelines separation by viscous-inviscid interaction [NASA-TM-105680] p 871 N92-29661 p 827 N92-28477 [NASA-TP-3197] TURBINE PUMPS Analysis of results of an Euler-equation method applied for active control technology transport aircraft Rotor support for the STME oxygen turbopump [NLR-TP-90129-U] p 878 N92-28652 to leading-edge vortex flow [NLR-TP-90368-U] p 904 A92-48872 Applied analytical combustion/emissions research at the Investigation of three-dimensional flow field in a turbine p 827 N92-28657 NASA Lewis Research Center Wave drag determination in the transonic full-potential including rotor/stator interaction. II - Three-dimensional [NASA-TM-105731] p 890 N92-29343 flow code MATRICS flow field at the exit of the nozzle Hyperbolic grid generation control by panel methods [NLR-TP-91061-U] p 924 N92-29604 | AIAA PAPER 92-3326| p 828 N92-28709 p 826 A92-48909 Explicit Navier-Stokes computation of turbomachinery TURBINE WHEELS Results of a flight simulator experiment to establish flows Magnetic particle testing of turbine blades mounted on handling quality guidelines for the design of future transport p 909 N92-28879 the turbine rotor shaft p 898 A92-46498

p 902 A92-48592

p 865 A92-48979

Numerical analysis of an engine turbine disk loaded with

Failure model development for an integrally bladed

a large number of thermomechanical cycles

[ONERA, TP NO. 1992-31]

[AIAA PAPER 92-3420]

turbine wheel

through Euler analysis

Predicted pressure distribution on a prop-fan blade hrough Euler analysis p 810 A92-46791

Numerical experiments on unsteady shock reflection processes using the thin-layer Navier-Stokes equations p 818 A92-47155

TURBINES	Turboshaft/turboprop cycle sensitivity analysis	High Reynolds number flows using liquid and gaseous
A comparison of the calculated and experimental off-design performance of a radial flow turbine	[AIAA PAPER 92-3476] p 865 A92-49020 TURBOSHAFTS	helium [ISBN 0-387-97475-X] p 897 A92-45261
[NASA-CR-189207] p 831 N92-29402	High speed rotorcraft propulsion concepts to control	Remarks on high-Reynolds-number turbulence
TURBOCOMPRESSORS	power/speed characteristics	experiments and facilities p 881 A92-45267
A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial	[AIAA PAPER 92-3367] p 865 A92-48940 Turboshaft/turboprop cycle sensitivity analysis	Response characteristics of a wing in supersonic flow near flutter boundary
compressor cascades p 819 A92-47691	[AIAA PAPER 92-3476] p 865 A92-49020	[SAE PAPER 911999] p 789 A92-45401
Advanced CFD simulation and testing of compressor	Contingency power for a small turboshaft engine by using	A new approach for the calculation of transitional
blading in the multistage environment AIAA PAPER 92-3040 p 822 A92-48701	water injection into turbine cooling air [NASA-TM-105680] p 871 N92-29661	flows AIAA PAPER 92-2669 p 798 A92-45524
Wake mixing and performance measurements in a linear	TURBULENCE	Calculation of high speed base flows
compressor cascade with crenulated trailing edges	Expand turbulence laboratory facilities to meet new DOD	[AIAA PAPER 92-2679] p 799 A92-45531
[AIAA PAPER 92-3188] p 824 A92-48800 DYNamic Turbine Engine Compressor Code	research interest [AD-A248581] p 883 N92-28388	Turbulent drag reduction by laminar sublayer thickening
(DYNTECC) - Theory and capabilities	Laser anemometer measurements and computations in	[AIAA PAPER 92-2707] p 801 A92-45549
[AIAA PAPER 92-3190] p 923 A92-48802	an annular cascade of high turning core turbine vanes	Computation of turbulent flow about cone-derived
Numerical investigation of surge and rotating stall in multistage axial compressors	[NASA-TP-3252] p 830 N92-28980 Methods for direct simulation of transition in hypersonic	waverider [AIAA PAPER 92-2726] p 804 A92-45562
[AIAA PAPER 92-3193] p 825 A92-48804	boundary layers 2 p 912 N92-30064	Interaction between crossing oblique shocks and a
A theoretical study of sensor-actuator schemes for rotating stall control	TURBULENCE EFFECTS	turbulent boundary layer p 812 A92-46882 Computation of turbulent, separated, unswept
[AIAA PAPER 92-3486] p 878 A92-49025	Hang-glider response to atmospheric inputs p 874 A92-46765	compression ramp interactions p 813 A92-46897
Dynamic simulation of compressor and gas turbine	Reconstruction of flight path in turbulence	Segmental heat transfer in a pin fin channel with ejection
performance p 869 N92-28463 Users manual for updated computer code for axial-flow	p 874 A92-46777	holes p 900 A92-47267 A time marching method in finite volume for transonic
compressor conceptual design	Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778	diffuser turbulent flows p 819 A92-47690
[NASA-CR-189171] p 924 N92-30207	Establishing a database for flight in the wakes of	Calculation of fully three-dimensional separated flows
TURBOFAN ENGINES An analysis of the effect of centrifugal force on the impact	structures p 810 A92-46782	with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577
resistance of composite fan blades for turbo-fan engines	On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945	Separation and vortex formation in turbulent flows
[SAE PAPER 912047] p 861 A92-45431	Motion errors in an airborne synthetic aperture radar	[ONERA, TP NO. 1992-7] p 822 A92-48579
High speed aerodynamics of upper surface blowing aircraft configurations	system p 840 A92-48416	Development and application of a zonal k-epsilon turbulence model for complex 3-D flowfields
[AIAA PAPER 92-2611] p 793 A92-45485	Viscous effects on a vortex wake in ground effect [NASA-CR-190400] p 907 N92-28361	[AIAA PAPER 92-3176] p 903 A92-48792
Commercial turbofan engine exhaust nozzle flow	TURBULENCE MODELS	Wake mixing and performance measurements in a linear
analyses using PAB3D [AIAA PAPER 92-2701] p 801 A92-45543	The DAM vertical shock-tube p 880 A92-45096 Computational evaluation of an airfoil with a Gurney	compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800
Suppression of fatigue-inducing cavity acoustic modes	flap	A numerical study of two-phase flow in gas turbine
in turbofan engines p 925 A92-46809	[AIAA PAPER 92-2708] p 802 A92-45550	combustors
Engine fan blade low cycle fatigue testing [AIAA PAPER 92-3478] p 866 A92-49021	Computation of turbulent, separated, unswept compression ramp interactions p 813 A92-46897	[AIAA PAPER 92-3468] p 905 A92-49015 A study of the flammability limit of the backward facing
Thrust stand evaluation of engine performance	On the adequacy of modeling turbulence and related	step flow combustion
improvement algorithms in an F-15 airplane	effects on helicopter response p 847 A92-46945	[AIAA PAPER 92-3846] p 895 A92-49136
[AIAA PAPER 92-3747] p 866 A92-49111 Design and off-design point characteristics of Separated	Experience with the Johnson-King turbulence model in a transonic turbine cascade flow solver	Flow gradient corrections on hot-wire measurements using an X-wire probe
Core Ultra High Bypass Engine (SCUBE)	p 821 A92-48207	(NLR-TP-90255-U) p 829 N92-28713
[AIAA PAPER 92-3776] p 867 A92-49120	Comparative study of turbulence models in predicting	Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820
Diffuser casing upgrade for an advanced turbofan [NLR-TP-90097-U] p 870 N92-28711	hypersonic inlet flows [AIAA PAPER 92-3098] p 824 A92-48740	shear flow p 829 N92-28820 Laser anemometer measurements and computations in
Effects of bleed air extraction on thrust levels on the	FNS analysis of an axisymmetric scramjet inlet	an annular cascade of high turning core turbine vanes
F404-GE-400 turbofan engine [NASA-TM-104247] p 871 N92-29425	[AIAA PAPER 92-3100] p 824 A92-48742	[NASA-TP-3252] p 830 N92-28980 Explicit Navier-Stokes computation of turbomachinery
TURBOFANS	A turbulence model based on RNG for quasi-three-dimensional cascade flows renormalization	flows
Steady and transient performance calculation method	group methods	[AD-A248458] p 911 N92-29933
for prediction, analysis, and identification p 869 N92-28461	[AIAA PAPER 92-3312] p 825 A92-48898 Numerical study of secondary separation in glancing	Active thermal isolation for temperature responsive sensors
Component performance requirements	shock/turbulent boundary layer interactions	[NASA-CASE-LAR-14612-1] p 911 N92-29954
p 869 N92-28462	[AIAA PAPER 92-3666] p 907 A92-49087	TURBULENT HEAT TRANSFER
Study on two variable control plan for twin spool turbojet	Turbulence modeling: Survey of activities in Belgium and the Netherlands, and appraisal of the status and a view	Turbulent spot generation and growth rates in a transonic boundary layer
engine p 862 A92-47697	on the prospects	[AD-A250221] p 909 N92-29118
Analytical design and demonstration of a low-cost	[NLR-TP-90184-U] p 908 N92-28694	TURBULENT JETS
expendable turbine engine combustor [AIAA PAPER 92-3754] p 867 A92-49112	Computation of three-dimensional effects on two dimensional wings	Eigenfunction analysis of turbulent mixing phenomena p 898 A92-45826
Conceptual study of separated core ultra high bypass	[NASA-CR-190576] p 832 N92-29691	TURBULENT MIXING
engine	TURBULENT BOUNDARY LAYER	The DAM vertical shock-tube p 880 A92-45096
[AIAA PAPER 92-3775] p 867 A92-49119 TURBOMACHINE BLADES	Turbulent drag reduction by laminar sublayer thickening	Eigenfunction analysis of turbulent mixing phenomena p 898 A92-45826
A new method for predicting the end wall boundary layers	[AIAA PAPER 92-2707] p 801 A92-45549	Mixing in the dome region of a staged gas turbine
and the blade force defects inside the passage of axial	Surface and flow field measurements in a symmetric	combustor
compressor cascades p 819 A92-47691 Vane-blade interaction in a transonic turbine, 1 -	crossing shock wave/turbulent boundary layer flow [AIAA PAPER 92-2634] p 806 A92-45574	[AIAA PAPER 92-3089] p 903 A92-48734 TURBULENT WAKES
Aerodynamics	Interaction between crossing oblique shocks and a	High-Reynolds-number test requirements in low-speed
[AIAA PAPER 92-3323] p 825 A92-48906 Explicit Navier-Stokes computation of turbomachinery	turbulent boundary layer p 812 A92-46882	aerodynamics p 787 A92-45263
flows	Total losses in turbulent flows inside conical diffusers p 819 A92-47782	New method of swirl control in a diffusing S-duct p 809 A92-45859
[AD-A248458] p 911 N92-29933	Supersonic jet mixing enhancement by 'delta-tabs'	Explicit Navier-Stokes computation of turbomachinery
TURBOMACHINERY A higher-order accurate Navier-Stokes solver for	[AIAA PAPER 92-3548] p 826 A92-49063	flows
transonic and supersonic flows in turbomachinery	Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions	[AD-A248458] p 911 N92-29933
[AIAA PAPER 92-3044] p 822 A92-48704	[AIAA PAPER 92-3666] p 907 A92-49087	TVD SCHEMES Numerical study on a supersonic open cavity flow with
Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades	Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction	geometric modification of aft bulkhead
[AIAA PAPER 92-3073] p 823 A92-48723	[AIAA PAPER 92-3668] p 826 A92-49088	[AIAA PAPER 92-2627] p 794 A92-45499
Laser anemometer measurements and computations in	Turbulence modeling: Survey of activities in Belgium and	LU-SGS implicit scheme for entry vehicle flow computation and comparison with aerodynamic data
an annular cascade of high turning core turbine vanes [NASA-TP-3252] p 830 N92-28980	the Netherlands, and appraisal of the status and a view	[AIAA PAPER 92-2671] p 798 A92-45526
TURBOPROP AIRCRAFT	on the prospects [NLR-TP-90184-U] p 908 N92-28694	Computations of hypersonic flows around a
Noise of two high-speed model counter-rotation propellers at takeoff/approach conditions	Turbulent spot generation and growth rates in a transonic	three-dimensional concave/convex body
	boundary layer	[AIAA PAPER 92-2606] p 805 A92-45570

URBULENT FLOW

Simultaneous imaging and interferometric turbule visualization in a high-velocity mixing/shear layer p 896 A92-45130

p 909 N92-29118

boundary layer [AD-A250221]

TURBULENT FLOW

p 925 A92-46799

p 861 A92-45432

Finite elements analysis of flexural edge wave for

TURBOPROP ENGINES

composite fan blades [SAE PAPER 912048]

Development and application of a zonal k-epsilon	ULTRASONIC TESTS	Development of an unsteady three-dimensiona
turbulence model for complex 3-D flowfields [AIAA PAPER 92-3176] p 903 A92-48792	Nondestructive inspection perspectives p 915 N92-30121	viscous-inviscid interaction numerical method for the calculation of airfoils vibration
TWISTING	ULTRAVIOLET RADIATION	[ONERA-RSF-7/3617-AY-022A] p 830 N92-29206
Linear analysis of naturally curved and twisted	Examination of ultraviolet radiation theory for bow shock	Production of periodical Mach number variations in high
anisotropic beam p 899 A92-46936	rocket experiments	subsonic flow in a blow down wind tunnel, and its influence
TWO DIMENSIONAL BODIES	[AIAA PAPER 92-2871] p 901 A92-47853	on profile measurements
Transonic unsteady inviscid and viscous flow's	UNIFORM FLOW	[ETN-92-91492] p 833 N92-29889
simulation around 2-D moving bodies	Outflow boundary conditions using Duhamel's	UPGRADING
[AIAA PAPER 92-2704] p 801 A92-45546	equation p 813 A92-46913 UNSTEADY AERODYNAMICS	Life cycle costs of the C-130 electrical power system
Time-average loading on a two-dimensional airfoil in a	Critical effects of downstream boundary conditions on	upgrade
large amplitude motion p 811 A92-46805	vortex breakdown	[AD-A246759] p 786 N92-28348
Analysis of motion of airfoil flying over wavy-wall surface	[AIAA PAPER 92-2601] p 792 A92-45478	UPPER SURFACE BLOWING
(lifting surface method) p 818 A92-47100	Prediction of rotor unsteady airloads using vortex	High speed aerodynamics of upper surface blowing
Construction of a numerical optimization method for the	filament theory	aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485
definition of hypersupported profiles	[AIAA PAPER 92-2610] p 792 A92-45484	·
[ONERA-RSF-43/1736-AY-146A] p 908 N92-28788	A fast three-dimensional vortex method for unsteady	Aerodynamic characteristics obtained from alpha sweep test of the quiet STOL experimental aircraft ASKA
TWO DIMENSIONAL BOUNDARY LAYER	wake calculations	[NAL-TR-1112] p 853 N92-28901
Simplified linear stability transition prediction method for	[AIAA PAPER 92-2624] p 794 A92-45496	UPPER SURFACE BLOWN FLAPS
separated boundary layers p 812 A92-46883	Unsteady Navier-Stokes simulations of supersonic flow	Wind tunnel investigation of an improved upper surface
A fast, uncoupled, compressible, two-dimensional,	over a three-dimensional cavity [AIAA PAPER 92-2632] p 795 A92-45504	blown flap transport semi-span model
unsteady boundary layer algorithm with separation for engine inlets	Spatial and temporal adaptive procedures for the	[SAE PAPER 911993] p 789 A92-45395
[AIAA PAPER 92-3082] p 823 A92-48729	unsteady aerodynamic analysis of airfoils using	UPWIND SCHEMES (MATHEMATICS)
TWO DIMENSIONAL FLOW	unstructured meshes	An improved approach for the computation of
Measurements of the velocity and vorticity fields around	[AIAA PAPER 92-2694] p 800 A92-45540	transonic/supersonic flows with applications to aerospace
a pitching airfoil	Hang-glider response to atmospheric inputs	configurations
[AIAA PAPER 92-2626] p 794 A92-45498	p 874 A92-46765	[AIAA PAPER 92-2613] p 793 A92-45487
A nonlinear relaxation/quasi-Newton algorithm for the	Unsteady aerodynamics of a Wortmann wing at low	Effect of throat contouring on two-dimensional
compressible Navier-Stokes equations	Reynolds numbers p 810 A92-46778	converging-diverging nozzles using URS method
[AIAA PAPER 92-2643] p 796 A92-45510	Temporal adaptive Euler/Navier-Stokes algorithm	[AIAA PAPER 92-2659] p 797 A92-45520
Predictions of a turbulent backward-facing-step flow with	involving unstructured dynamic meshes	Characteristics of the Shuttle Orbiter leeside flow during
a cubic pressure-strain model	p 812 A92-46887	a reentry condition
[AIAA PAPER 92-2647] p 796 A92-45514	The unsteady interaction of a 3-dimensional vortex	[AIAA PAPER 92-2951] p 821 A92-47915
Computational evaluation of an airfoil with a Gurney	filament with a cylinder p 813 A92-46934	USER MANUALS (COMPUTER PROGRAMS)
flap	Numerical experiments on unsteady shock reflection	Users manual for updated computer code for axial-flow
[AIAA PAPER 92-2708] p 802 A92-45550	processes using the thin-layer Navier-Stokes equations	compressor conceptual design
Compressible Navier-Stokes solutions for a suction	p 818 A92-47155	[NASA-CR-189171] p 924 N92-30207
boundary control airfoil	The numerical simulation of compressible flow around	USER REQUIREMENTS
[AIAA PAPER 92-2710] p 802 A92-45551	an airfoil at high angle of attack p 818 A92-47686	Instrumentation requirements for laminar flow research
Numerical simulation of multizone two-dimensional	Airfoil wake and linear theory gust response including	in the NLR high speed wind tunnel HST
transonic flows using the full Navier-Stokes equations p 815 A92-46955	sub and superresonant flow conditions	[NLR-TP-89158-U] p 887 N92-28669 Development of a flight information system using the
Mesh adaptivity with the quadtree method	[AIAA PAPER 92-3074] p 823 A92-48724	structured method
p 816 A92-47041	Study of the leading-edge vortex dynamics in the	[AD-A248207] p 859 N92-29222
Solution of the Burnett equations for hypersonic flows	unsteady flow over an airfoil	(1.0 1.2 1020), p 000 1102 20222
near the continuum limit	[AD-A247532] p 829 N92-28865	V
		V
[AIAA PAPER 92-2922] p 821 A92-47894	Spatial and temporal adaptive procedures for the	V
[AIAA PAPER 92-2922] p 821 A92-47894 Establishing two-dimensional flow in a large-scale planar	unsteady aerodynamic analysis of airfoils using	•
	unsteady aerodynamic analysis of airfoils using unstructured meshes	V-22 AIRCRAFT
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445	V-22 AIRCRAFT Military utility of medium speed V/STOL designs
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London,
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3469] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London,
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unstready aerodynamic analysis of airfolls using unstructured meshes [NASA-TM-107635] p 831 N92-29445	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Transonic airfoil and wing design using Navier-Stokes codes	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs Evolution of ASTOVL aircraft design p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45306 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs Evolution of ASTOVL aircraft design p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45564 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs Evolution of ASTOVL aircraft design p 841 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL Designs Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45311 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 803 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion?
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Initial validation of an unsteady Euler/Navier-Stokes flow	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? ISAE PAPER 911976 p 843 A92-45383
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45324 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Eller/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-45202
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Calculation of fully three-dimensional separated flows	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? ISAE PAPER 911976 p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2739] p 805 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry Comment on 'Canard-wing interaction in unsteady supersonic flow' p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-45202
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug. 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45314 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? ISAE PAPER 911976 p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Catculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Numerical solutions of unsteady oscillating flows past	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 91204] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 U U.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46807 Numerical solutions of unsteady oscillating flows past an airfoil	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45313 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080]
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 US.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 803 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Catculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45450 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I -	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46850 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46856 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 825 A92-48817 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I -	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-45202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform [DE92-013231] p 909 N92-28814
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 U.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 815 A92-46806 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-46877 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft (SAE PAPER 912080) p 844 A92-45455 Pulse jet one-way valve performance [IAIA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform [DE92-013233] p 999 N92-28814
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed p 786 A92-47821	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906 Calculation of unsteady transonic flows with mild	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform [DE92-013233] vANADIUM ALLOYS Surface residual stress analysis of metals and alloys
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed p 786 A92-47821 UH-60A HELICOPTER	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46856 Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45324 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-45620 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform [DE92-01323] p 909 N92-28814 VANADIUM ALLOYS Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-28426
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 U.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed p 786 A92-47821 UH-60A HELICOPTER Rotorcraft In-Flight Simulation Research at NASA Ames	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction as parated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-46877 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction [NASA-TP-3197] p 827 N92-28477	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45322 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform IDE92-013233] VANADIUM ALLOYS Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-288426
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92:3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92:3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed p 786 A92-47821 UH-60A HELICOPTER	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 803 A92-45557 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight p 815 A92-46956 Catculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-46877 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction [NASA-TP-3197] p 827 N92-28477 Study of the leading-edge vortex dynamics in the	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45303 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45325 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform [DE92-013233] vANADIUM ALLOYS Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-28814
Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Prediction of gas turbine combustor flow by a finite element code [AIAA PAPER 92-3469] p 906 A92-49016 Explicit Navier-Stokes computation of turbomachinery flows [AD-A249284] p 909 N92-28879 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfolis using unstructured meshes [NASA-TM-107635] p 831 N92-29445 TWO DIMENSIONAL MODELS Transonic airfoli and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance [NAL-TM-632] p 887 N92-28829 TWO FLUID MODELS The DAM vertical shock-tube p 880 A92-45096 TWO PHASE FLOW Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416 A numerical study of two-phase flow in gas turbine combustors [AIAA PAPER 92-3468] p 905 A92-49015 UU.S.S.R. Emerging technology in the Soviet Union: Selected papers with analysis [ISBN 1-55831-117-1] p 929 A92-46201 German-GUS cooperation in civil aviation p 785 A92-47592 CIS engines. I - The range revealed p 786 A92-47821 UH-60A HELICOPTER Rotorcaft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for	unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 UNSTEADY FLOW Recent applications of the FNS zonal Method to complex flow problems [SAE PAPER 912003] p 789 A92-45404 Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid [AIAA PAPER 92-2733] p 805 A92-45567 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 Unsteady crossflow on a delta wing using particle image velocimetry p 811 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46804 Comment on 'Canard-wing interaction as parated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-46877 Numerical solutions of unsteady oscillating flows past an airfoil [AIAA PAPER 92-3212] p 825 A92-48817 Vane-blade interaction in a transonic turbine. I - Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction [NASA-TP-3197] p 827 N92-28477	V-22 AIRCRAFT Military utility of medium speed V/STOL designs p 841 A92-45308 V/STOL AIRCRAFT International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings [ISBN 0-903409-68-2] p 783 A92-45302 An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304 Harrier international programme p 841 A92-45304 Harrier international programme p 841 A92-45305 Military utility of medium speed V/STOL designs p 841 A92-45308 Evolution of ASTOVL aircraft design p 842 A92-45311 Recent developments at the Shoeburyness STOVL test facility p 881 A92-45314 Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft performance p 787 A92-45322 Experimental and analytical study of close-coupled ventral nozzles for ASTOVL aircraft p 861 A92-45325 High speed VSTOL on the horizon - The answer to congestion? [SAE PAPER 911976] p 843 A92-45383 Aviation, motor, and space designs research and development in U.S.S.R. p 784 A92-46202 VALVES Development of the DDV actuation system on the IDF aircraft [SAE PAPER 912080] p 844 A92-45455 Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790 Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform IDE92-013233] VANADIUM ALLOYS Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-288426

The flow pattern and external heat transfer investigation	VERTICAL TAKEOFF	An adaptive grid method for computing the high speed
for gas turbine vanes end surfaces	Propulsion systems from takeoff to high-speed flight	3D viscous flow about a re-entry vehicle
[AIAA PAPER 92-3071] p 903 A92-48722	p 889 A92-46428	[AIAA PAPER 92-2685] p 799 A92-45534
Airfoil wake and linear theory gust response including	S-76B certification for vertical take-off and landing	Transonic unsteady inviscid and viscous flow's
sub and superresonant flow conditions [AIAA PAPER 92-3074] p 823 A92-48724	operations from confined areas	simulation around 2-D moving bodies
Vane-blade interaction in a transonic turbine, 1 -	[NLR-TP-90286-U] p 852 N92-28714	[AIAA PAPER 92-2704] p 801 A92-45546 Viscous flow past a nacelle isolated and in proximity
Aerodynamics	VERTICAL TAKEOFF AIRCRAFT The high speed challenge for rotary wing aircraft	of a flat plate
[AIAA PAPER 92-3323] p 825 A92-48906	[SAE PAPER 911974] p 842 A92-45381	[AIAA PAPER 92-2723] p 803 A92-45560
Laser anemometer measurements and computations in	Ducted fan VTOL for working platform	Viscous high-speed flow computations by adaptive mesh
an annular cascade of high turning core turbine vanes	[SAE PAPER 911995] p 843 A92-45397	embedding techniques p 808 A92-45839
[NASA-TP-3252] p 830 N92-28980	The effect of composite material allowable changes on	Unstructured and adaptive mesh generation for high
VAPORIZING	VTOL airframe weights p 848 A92-47629	Reynolds number viscous flows p 816 A92-47042
A distributed vaporization time-lag model for gas turbine combustor dynamics	Nonlinear control design for slightly nonminimum phase	Calculation of hypersonic, viscous, non-equilibrium flows around reentry bodies using a coupled boundary
[AIAA PAPER 92-3465] p 865 A92-49014	systems - Application to V/STOL aircraft	layer/Euler method
VARIABLE CYCLE ENGINES	p 876 A92-48160	[AIAA PAPER 92-2856] p 819 A92-47839
A preliminary design and analysis of an advanced	Conceptual study of separated core ultra high bypass	Enhancements to viscous-shock-layer technique
heat-rejection system for an extreme altitude advanced	engine	[AIAA PAPER 92-2897] p 820 A92-47873
variable cycle diesel engine installed in a high-altitude	[AIAA PAPER 92-3775] p 867 A92-49119	Development of an efficient analysis for high Reynolds
advanced research platform	Design and off-design point characteristics of Separated	number inviscid/viscid interactions in cascades
[NASA-CR-186021] p 871 N92-29427	Core Ultra High Bypass Engine (SCUBE)	[AIAA PAPER 92-3073] p 823 A92-48723
VARIATIONS	[AIAA PAPER 92-3776] p 867 A92-49120	A fast, uncoupled, compressible, two-dimensional,
Examination of the main error factors with regards to secondary losses in compression and turbine cascades	Aircraft ship operations	unsteady boundary layer algorithm with separation for engine inlets
by variations of the blade picture ratio	[AGARD-AR-312] p 850 N92-28468 VERY LARGE SCALE INTEGRATION	[AIAA PAPER 92-3082] p 823 A92-48729
[ETN-92-91493] p 871 N92-29927	VHDL design and simulation for airborne graphics	Viscous effects on a vortex wake in ground effect
VELOCITY DISTRIBUTION	generation requirements VLSI hardware description	[NASA-CR-190400] p 907 N92-28361
Swirl number effects on confined flows in a model of	language p 902 A92-48465	Calculation of unsteady transonic flows with mild
a dump combustor p 896 A92-45202	Applications of silicon hybrid multi-chip modules to	separation by viscous-inviscid interaction
Boundary-layer measurements during a parallel	avionics p 859 N92-28379	[NASA-TP-3197] p 827 N92-28477
blade-vortex interaction	VIBRATION	Development of an unsteady three-dimensional
[AIAA PAPER 92-2623] p 794 A92-45495	Comparison of three controllers applied to helicopter	viscous-inviscid interaction numerical method for the
Multi-point inverse design of an infinite cascade of	vibration	calculation of airfoils vibration IONERA-RSF-7/3617-AY-022AI p.830 N92-29206
airfoils (AIAA PAPER 92-2650) p 797 A92-45517	(NASA-TM-102192) p 878 N92-28457 VIBRATION DAMPING	[ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 VISIBILITY
Vortex-in-cell analysis of wing wake roll-up	Response characteristics of a wing in supersonic flow	Transport delay measurements: Methodology and
[AIAA PAPER 92-2703] p 801 A92-45545	near flutter boundary	analysis for the F-16C combat engagement trainer, the
Quantification of canard and wing interactions using	[SAE PAPER 911999] p 789 A92-45401	display for advanced research and training, and the F-16A
spatial correlation velocimetry	Preliminary study of algorithm for real-time flutter	limited field of view
[AIAA PAPER 92-2687] p 807 A92-45588	monitoring	(AD-A248519) p 888 N92-29505
Unsteady crossflow on a delta wing using particle image	[SAE PAPER 912001] p 897 A92-45403	VISUAL AIDS
velocimetry p 811 A92-46804	Forebody vortex control for suppressing wing rock on	Identifying design requirements using integrated analysis
The flow pattern and external heat transfer investigation for gas turbine vanes end surfaces	a highly-swept wing configuration	structures p 922 A92-48527 VISUAL PERCEPTION
[AIAA PAPER 92-3071] p 903 A92-48722	[AIAA PAPER 92-2716] p 803 A92-45555 International Congress on Recent Developments in Air-	An aircraft landing accident caused by visually induced
A preliminary experimental investigation of local isotropy	and Structure-Borne Sound and Vibration, Auburn	spatial disorientation p 834 A92-44993
in high-Reynolds-number turbulence	University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2	VISUAL TASKS
p 912 N92-30042	p 924 A92-45876	The development of a real time visual flight simulator
VELOCITY MEASUREMENT	Suppression of fatigue-inducing cavity acoustic modes	for tactical operations research and measurement
Quantification of canard and wing interactions using	in turbofan engines p 925 A92-46809	p 880 A92-45027
spatial correlation velocimetry	A new method of helicopter rotor blade motion control	VOICE COMMUNICATION
[AIAA PAPER 92-2687] p 807 A92-45588	p 875 A92-47786	Improving the LAMP Mk 3 SH-60B HF communication
The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade	Comparison of three controllers applied to helicopter vibration	system {AD-A245970} p 910 N92-29344
[ASME PAPER 91-GT-221] p 899 A92-46825	[NASA-TM-102192] p 878 N92-28457	VORTEX ALLEVIATION
Laser velocimetry measurements in an MHD	VIBRATION EFFECTS	New method of swirl control in a diffusing S-duct
aerodynamic duct	Oscillations of balloon-flight altitude	p 809 A92-45859
[AIAA PAPER 92-2986] p 899 A92-46996	p 836 A92-46660	Flow visualization studies of a sideslipping,
Study of the leading-edge vortex dynamics in the	VIBRATION MEASUREMENT	canard-configured X-31A-Like fighter aircraft model
unsteady flow over an airfoil	The use of optical sensors and signal processing gas	[AD-A245940] p 829 N92-28883 VORTEX BREAKDOWN
[AD-A247532] p 829 N92-28865 A 4-spot time-of-flight anemometer for small centrifugal	turbine engines p 856 A92-46247	
compressor velocity measurements	VIBRATION MODE Preliminary study of algorithm for real-time flutter	Numerical investigation into high-angle-of-attack leading-edge vortex flow
[NASA-TM-105717] p 909 N92-29105	manitoring	[AIAA PAPER 92-2600] p 791 A92-45477
VENTILATION	[SAE PAPER 912001] p 897 A92-45403	Critical effects of downstream boundary conditions on
Computational fluid dynamics applications in airplane	Ritz vectors synthesis versus modal synthesis for	vortex breakdown
cabin ventilation system design	fluid-structure interaction modeling p 898 A92-45885	[AIAA PAPER 92-2601] p 792 A92-45478
[SAE PAPER 911992] p 788 A92-45394	The relationship between mode localization and energy	Prediction of leading-edge vortex breakdown on a delta
Indirect measurements of convective flow by IR	transmission parameters in the vibration of coupled	wing oscillating in roll [AIAA PAPER 92-2677] p 807 A92-45585
thermography [ONERA, TP NO. 1992-46] p 902 A92-48607	structures p 925 A92-45921 On the choice of appropriate bases for nonlinear	
VERBAL COMMUNICATION	dynamic modal analysis p 847 A92-46927	Nonuniform motion of leading-edge vortex breakdown on ramp pitching delta wings p 808 A92-45828
An analysis of aircrew communication patterns and	Analytical evaluation of resonant response of spiral bevel	VORTEX FILAMENTS
content	gears in the RAH-66 helicopter Fantail transmission	Prediction of rotor unsteady airloads using vortex
[AD-A246618] p 907 N92-28253	[AIAA PAPER 92-3495] p 906 A92-49031	filament theory
VERTICAL DISTRIBUTION	VISCOPLASTICITY	[AIAA PAPER 92-2610] p 792 A92-45484
Feasibility study of hypersonic clinometric	Numerical analysis of an engine turbine disk loaded with	The unsteady interaction of a 3-dimensional vortex
measurements at R3Ch [ONERA-RSF-136/1865-AY-728-] p 829 N92-28789	a large number of thermomechanical cycles	filament with a cylinder p 813 A92-46934
[ONERA-RSF-136/1865-AY-728-] p 829 N92-28789 VERTICAL FLIGHT	[ONERA, TP NO. 1992-31] p 902 A92-48592 VISCOSITY	VORTEX GENERATORS
Oscillations of balloon-flight altitude	Grid sensitivity in low Reynolds number hypersonic	Design and analysis of vortex generators on reengined
p 836 A92-46660	continuum flows p 817 A92-47057	Boeing 727-100QF center inlet S-duct by a reduced
VERTICAL LANDING	VISCOUS DRAG	Navier-Stokes code [AIAA PAPER 92-2700] p 800 A92-45542
Military utility of medium speed V/STOL designs	Aerodynamic shape optimization of hypersonic	Active control of vortex structures in a separating flow
p 841 A92-45308	configurations including viscous effects	over an airfoil
Prediction and measurement of jet flowfield features for	[AIAA PAPER 92-2635] p 795 A92-45506	[AIAA PAPER 92-2728] p 804 A92-45563
ASTOVL aircraft p 787 A92-45318 Ground surface erosion - British Aerospace test facility	VISCOUS FLOW Three dimensional orthogonal to surface structured grid	Separation control on high Reynolds number
and experimental studies p 881 A92-45323	Three-dimensional orthogonal-to-surface structured grid generation with transonic Navier-Stokes flow solutions for	multi-element airfoils
Internal reversing flow in a tailpipe offtake configuration	a commercial transport configuration	[AIAA PAPER 92-2636] p 806 A92-45575
for SSTOVL aircraft	[AIAA PAPER 92-2616] p 793 A92-45490	Pitch rate/sideslip effects on leading-edge extension
[NASA-TM-105698] p 868 N92-28418		vortices of an F/A-18 aircraft model
VEGTICAL MOTION CIMILI ATORC	Application of an unstructured Navier-Stokes solver to	Torticos or an i fire to another moder
VERTICAL MOTION SIMULATORS	multi-element airfoils operating at transonic maneuver	p 874 A92-46810
The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545		

WALL PRESSURE WEIGHT REDUCTION Aerodynamic characteristics obtained from alpha sweep test of the quiet STOL experimental aircraft ASKA Comparison between two 3D-NS-codes and experiment Advanced Rotorcraft Transmission (ART) Program p 853 N92-28901 on a turbine stator summary [AIAA PAPER 92-3365] [AIAA PAPER 92-3042] p 822 A92-48703 **VORTEX SHEDDING** p 905 A92-48938 Separation and vortex formation in turbulent flows [ONERA, TP NO. 1992-7] p 822 A92-4 Numerical simulation of a confined transonic normal WHEEL BRAKES shock wave/turbulent boundary layer interaction Characterization of thermal performance of wheel p 822 A92-48579 [AIAA PAPER 92-3668] p 826 A92-49088 outboard of an aircraft WIND (METEOROLOGY) p 849 A92-48352 VORTEX SHEETS WALL TEMPERATURE A method for computing the 3-dimensional flow about Airdata calibration atmospheric wind profiles
WIND MEASUREMENT wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP Effect of model cooling on periodic transonic flow techniques for measuring p 813 A92-46900 p 856 A92-46792 p 833 N92-29916 [NLR-TR-86006-U] Comparative study of turbulence models in predicting Airdata calibration techniques for measuring VORTICES atmospheric wind profiles hypersonic inlet flows p 856 A92-46792 The effects of nozzle exit geometry on forebody vortex [AIAA PAPER 92-3098] p 824 A92-48740 Expand turbulence laboratory facilities to meet new DOD control using blowing [AIAA PAPER 92-2603] A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence esearch interest p 792 A92-45480 I AD-A248581 | p 883 N92-28388 Experimental investigation of the flowfield of an p 912 N92-30042 On the optimization of windshear warning and guidance oscillating airfoil
[AIAA PAPER 92-2622] WARFARE systems [NLR-TP-90196-U] p 793 A92-45494 A neural network based postattack damage assessment p 837 N92-29703 Airfoil pressure measurements during oblique shock p 922 A92-48520 WIND PROFILES rave-vortex interaction in a Mach 3 stream WARNING SYSTEMS Remote measurements of supercooled integrated liquid p 795 A92-45503 [AIAA PAPER 92-2631] EICAS in an integrated cockpit --- Engine Indication Crew water during WISP/FAA aircraft icing program Visualization of stopping flow over airfoils [AIAA PAPER 92-2730] p 804 Alerting System p 855 A92-44922 p 915 A92-46788 p 804 A92-45564 On the optimization of windshear warning and guidance Airdata calibration techniques measuring Experimental investigation of vortex dynamics on delta p 856 A92-46792 systems atmospheric wind profiles [NLR-TP-90196-U]
WASTE ENERGY UTILIZATION p 837 N92-29703 WIND SHEAR wings p 804 A92-45565 [AIAA PAPER 92-2731] Aircraft spoiler effects under wind shear Configuration effects on the ingestion of hot gas into p 796 A92-45509 Forebody flow control on a full-scale F/A-18 aircraft [AIAA PAPER 92-2674] p 806 A92-45583 [AIAA PAPER 92-2642] the engine intake
WATER INJECTION p 842 A92-45315 Thrust laws for microburst wind shear penetration p 873 A92-46750 Calculation of potential flow around airfoils using a Contingency power for a small turboshaft engine by using Mathematical modeling of the effect of windshear on discrete vortex method p 808 A92-45827 water injection into turbine cooling air [NASA-TM-105680] the dynamics of a landing aircraft p 875 A92-47784 Effect of a nose-boom on forebody vortex flow p 871 N92-29661 On the optimization of windshear warning and guidance p 812 A92-46818 WATER TUNNEL TESTS Experimental investigation of the parallel vortex-airfoil systems Water tunnels p 880 A92-45266 [NLR-TP-90196-U] p 837 N92-29703 interaction at transonic speeds p 813 A92-46901 Dynamically enhanced sustained lift using oscillating leading-edge flaps WIND TUNNEL APPARATUS An improved multiple line-vortex method for simulation Studies in general aviation aerodynamics [NASA-CR-190431] p 827 of separated vortices of slender wings [AIAA PAPER 92-2625] p 794 A92-45497 p 827 N92-28511 p 819 A92-47694 Experimental study of vortex flows over delta wings in Instrumentation requirements for laminar flow research Supersonic jet mixing enhancement by 'delta-tabs' [AIAA PAPER 92-3548] p 826 A92-49063 wing-rock motion p 810 A92-46787 in the NLR high speed wind tunnel HST [NLR-TP-89158-U] p Pitch rate/sideslip effects on leading-edge extension p 887 N92-28669 Viscous effects on a vortex wake in ground effect vortices of an F/A-18 aircraft model Flow quality studies of the NASA Lewis Research Center p 907 N92-28361 [NASA-CR-190400] p 874 A92-46810 8- by 6-foot supersonic/9- by 15-foot low speed wind Study of the leading-edge vortex dynamics in the **WAVE DRAG** tunnel unsteady flow over an airfoil Aerodynamic shape optimization of hypersonic [NASA-TM-105417] p 829 N92-28865 p 887 N92-28673 [AD-A247532] configurations including viscous effects Upgrading the data processing section of the NAL Gust Wind Tunnel data processing system Explicit Navier-Stokes computation of turbomachinery p 795 A92-45506 [AIAA PAPER 92-2635] [NAL-TM-635] p 888 N92-28833 The design of test-section inserts for higher speed Minimizing supersonic wave drag with physical constraints at design and off-design Mach numbers p 911 N92-29933 [AD-A248458] VORTICITY p 811 A92-46808 aeroacoustic testing in the Ames 80- by 120-foot wind ρ 880 A92-45266 Wave drag determination in the transonic full-potential flow code MATRICS A fast three-dimensional vortex method for unsteady [NASA-TM-103915] n 927 N92-28909 wake calculations [NLR-TP-90062-U] WAVE GENERATION p 828 N92-28709 Study of optical techniques for the Ames unitary wind [AIAA PAPER 92-2624] p 794 A92-45496 tunnels. Part 3: Angle of attack INASA-CR-190541 I Measurements of the velocity and vorticity fields around Oscillation of oblique shock waves generated in a two n 888 N92-29655 a pitching airfoil dimensional asymmetric nozzle [SAE PAPER 912061] WIND TUNNEL CALIBRATION [AIAA PAPER 92-2626] p 794 A92-45498 p 791 A92-45443 Calibration-related pseudo-Reynolds number trends in Experimental development of spanwise vortex models with streamwise decay due to wall interaction WAVE INTERACTION transonic wind tunnels. p 882 A92-46780 Effect of a fan of rarefaction waves on the development WIND TUNNEL MODELS p 799 A92-45535 [AIAA PAPER 92-2688] Vortex-in-cell analysis of wing wake roll-up [AIAA PAPER 92-2703] p 801 of disturbances in a supersonic boundary layer High speed aerodynamics of upper surface blowing p 809 A92-46519 aircraft configurations [AIAA PAPER 92-2611] p 801 A92-45545 **WAVE PROPAGATION** p 793 A92-45485 Separation and vortex formation in turbulent flows Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 [ONERA, TP NO. 1992-7] VORTICITY EQUATIONS p 822 A92-48579 Scale effects on the flow past the mated Space Shuttle p 836 A92-45425 configuration Effect of walls on the supersonic reacting mixing layer p 912 N92-30065 [AIAA PAPER 92-2680] p 799 A92-45532 Streamlines, vorticity lines, and vortices around three-dimensional bodies p 808 A92-45845 LDV measurements on a rectangular wing with a p 808 A92-45845 simulated glaze ice accretion [AIAA PAPER 92-2690] Assessment of valve actuator motor rotor degradation p 800 A92-45537 by Fourier Analysis of current waveform On-line performance evaluation of multiloop digital p 909 N92-28814 [DE92-013233] control systems ontrol systems p 873 A92-46739 Instrumentation requirements for laminar flow research WAKES WAVERIDERS Vortex-in-cell analysis of wing wake roll-up Heat transfer characteristics of hypersonic waveriders in the NLR high speed wind tunnel HST p 887 N92-28669 p 801 A92-45545 IAIAA PAPER 92-27031 with an emphasis on leading edge effects INLR-TP-89158-U1 [AIAA PAPER 92-2920] LAH-main rotor model test at the DNW Three-dimensional-mode resonance in far wakes p 821 A92-47892 p 898 A92-46252 WEAPON SYSTEM MANAGEMENT NLR-TP-90305-U] p 852 N92-28687 Establishing a database for flight in the wakes of WIND TUNNEL TESTS Gulf Range Drone Control Upgrade System Mobile p 810 A92-46782 On the measurement of subsonic flow around an Control System p 882 A92-47567 An aeroelastic analysis with a generalized dynamic appended body of revolution at cryogenic conditions in WEAPON SYSTEMS p 847 A92-46932 wake Current technology propulsion systems meet the STOVL the NTF p 880 A92-45265 Large-scale wind tunnel studies of a jet-engined powered Airfoil wake and linear theory gust response including window of opportunity p 860 A92-45307 ejector-lift STOVL aircraft p 842 A92-45313
Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test p 842 A92-45313 sub and superresonant flow conditions [AIAA PAPER 92-3074] p NAECON 91; Proceedings of the IEEE National p 823 A92-48724 Aerospace and Electronics Conference, Dayton, OH, May WALL FLOW 20-24, 1991. Vols. 1-3 A calculation of penetration of the jet issuing normally [SAE PAPER 911979] p 872 A92-45384 Spaceplane longitudinal aerodynamic parameter estimation by cable-mount dynamic wind-tunnel test [ISBN 0-7803-0084-X] p 786 A92-48426 into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 Expert Avionics Code Modification p 790 A92-45419 p 921 A92-48513 p 788 A92-45385 Analysis of motion of airfoil flying over wavy-wall surface [SAE PAPER 911980] Experimental studies on aerodynamic characteristics of SSTO vehicle at low subsonic speeds ifting surface method) p 818 A92-47100 A new method for predicting the end wall boundary layers (lifting surface method) Turbine aircraft engine operational trending and JT8D static component reliability study SSIO ventue at an acceptance of the second o and the blade force defects inside the passage of axial [DOT/FAA/CT-91/10] p 870 N92-28686 p 819 A92-47691 compressor cascades Evaluation of measured-boundary-condition methods for WEIGHT ANALYSIS 3D subsonic wall interference Massinfo - An intelligent mass properties information [SAE PAPER 911993] p 789 A92-45395 system p 928 A92-47628 Laminar separation bubbles and airfoil design at low INLR-TR-88072-UI p 832 N92-29884 Effect of walls on the supersonic reacting mixing layer The effect of composite material allowable changes on Revnolds numbers

p 912 N92-30065

VTOL airframe weights

p 797 A92-45515

[AIAA PAPER 92-2735]

p 848 A92-47629

WIND TUNNEL WALLS SUBJECT INDEX

p 832 N92-29657

Determination of aerodynamic sensitivity coefficients for wings in transonic flow

WIND TUNNEL WALLS		
Analysis of a pneumatic forebody flow control concept	WING LOADING	
about a full aircraft geometry	Design load predictions on a fighter-like aircraft wing	di
[AIAA PAPER 92-2678] p 799 A92-45530 Experimental development of spanwise vortex models	ρ 811 A92-46797 Time-average loading on a two-dimensional airfoil in a	۷IR
with streamwise decay due to wall interaction	large amplitude motion p 811 A92-46805	
[AIAA PAPER 92-2688] p 799 A92-45535 Alleviation of side force on tangent-ogive forebodies	Wing mass formula for subsonic aircraft p 845 A92-46812	IS WOI
using passive porosity	WING OSCILLATIONS	
[AIAA PAPER 92-2711] p 802 A92-45552	Response characteristics of a wing in supersonic flow	wo
An experimental investigation of the effect of leading-edge extensions on directional stability and the	near flutter boundary SAE PAPER 911999 p 789 A92-45401	WOI
effectiveness of forebody nose strakes	Dynamically enhanced sustained lift using oscillating	of
[AIAA PAPER 92-2715] p 802 A92-45554 Forebody vortex control for suppressing wing rock on	leading-edge flaps [AIAA PAPER 92-2625] p 794 A92-45497	be
a highly-swept wing configuration	LDV measurements in the three-dimensional near wake	WOI
[AIAA PAPER 92-2716] p 803 A92-45555 Dynamic LEX/forebody vortex interaction effects	of a stationary and oscillating rectangular wind [AIAA PAPER 92-2689] p 799 A92-45536	co
[AIAA PAPER 92-2732] p 804 A92-45566	Forebody vortex control for suppressing wing rock on	-
Separation control on high Reynolds number multi-element airfoils	a highly-swept wing configuration	wor
[AIAA PAPER 92-2636] p 806 A92-45575	[AIAA PAPER 92-2716] p 803 A92-45555 Dynamic LEX/forebody vortex interaction effects	cle
Exploratory investigation of a spanwise blowing concept for tip-stall control on cranked-arrow wings	[AIAA PAPER 92-2732] p 804 A92-45566	
[AIAA PAPER 92-2637] p 806 A92-45576	Flow over a twin-tailed aircraft at angle of attack. II - Temporal characteristics p 810 A92-46781	
Forebody flow control on a full-scale F/A-18 aircraft	Navier-Stokes computations on swept-tapered wings,	X RA
[AIAA PAPER 92-2674] p 806 A92-45583 Full-scale high angle-of-attack tests of an F/A-18	including flexibility p 810 A92-46786 Experimental study of vortex flows over delta wings in	
[AIAA PAPER 92-2676] p 806 A92-45584	wing-rock motion p 810 A92-46787	X RA
Separated high enthalpy dissociated laminar hypersonic flow behind a step - Pressure measurements	Chaotic oscillation in helicopter blade stall response p 846 A92-46922	A 117
p 809 A92-45858	WING PANELS	ex
Joint computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental	Static and dynamic flow field development about a	XRA
results p 812 A92-46890	porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500	ex
Two-stream, supersonic, wake flowfield behind a thick base. I - General features p 813 A92-46895	Vortex-in-cell analysis of wing wake roll-up	X-29
New hypersonic test methods developed at ONERA -	[AIAA PAPER 92-2703] p 801 A92-45545 Exploratory investigation of a spanwise blowing concept	(S
The R5 and F4 wind tunnels	for tip-stall control on cranked-arrow wings	,
[ONERA, TP NO. 1992-39] p 882 A92-48600 Comparative investigation of multiplane thrust vectoring	[AIAA PAPER 92-2637] p 806 A92-45576 WING PLANFORMS	
nozzles	Effects of wing planform on HSCT off-design	
[AIAA PAPER 92-3263] p 864 A92-48858 Studies in general aviation aerodynamics	aerodynamics High Speed Civil Transport [AIAA PAPER 92-2629] p 844 A92-45501	V 4 14
[NASA-CR-190431] p 827 N92-28511	Studies in general aviation aerodynamics	YAW
Comparison of LDA and LTA applications for propeller tests in wind tunnels	[NASA-CR-190431] p 827 N92-28511 WING PROFILES	inle
[NLR-MP-88031-U] p 827 N92-28658	An economic approach to accurate wing design	١
The windtunnel as a tool for laminar flow research [NLR-TP-90145-U] p 887 N92-28661	[SAE PAPER 912008] p 789 A92-45408 Transonic airfoil and wing design using Navier-Stokes	[N
LAH-main rotor model test at the DNW	codes	WAY
[NLR-TP-90305-U] p 852 N92-28687 Feasibility study of hypersonic clinometric	[AIAA PAPER 92-2651] p 797 A92-45518 Vortex-in-cell analysis of wing wake roll-up	
measurements at R3Ch	[AIAA PAPER 92-2703] p 801 A92-45545	
[ONERA-RSF-136/1865-AY-728-] p 829 N92-28789 Aerodynamic characteristics obtained from alpha sweep	Wing design for hanggliders having minimum induced drag p 811 A92-46814	
test of the quiet STOL experimental aircraft ASKA	WING TIP VORTICES	
[NAL-TR-1112] p 853 N92-28901 Calculation of support interferences on the aerodynamic	Measurements of the unsteady vortex flow over a wing-body at angle of attack	
coefficients for a wind tunnel calibration model	[AIAA PAPER 92-2729] p 808 A92-45598	
[ESA-TT-1247] p 830 N92-29159 Shock enhancement and control of hypersonic	Flow visualisation of a small diameter rotor operating	
combustion	at high rotational speeds with blades at small pitch angles p 814 A92-46949	
[AD-A248558] p 896 N92-29580 Evaluation of measured-boundary-condition methods for	Analysis of results of an Euler-equation method applied	
3D subsonic wall interference	to leading-edge vortex flow [NLR-TP-90368-U] p 827 N92-28657	
[NLR-TR-88072-U] p 832 N92-29884 WIND TUNNEL WALLS	WING TIPS	
Evaluation of measured-boundary-condition methods for	Aerodynamic characteristics near the tip of a finite wing by a panel method	
3D subsonic wall interference	[SAE PAPER 912020] p 790 A92-45413	
[NLR-TR-88072-U] p 832 N92-29884 WIND TUNNELS	WINGS Structural concept of main wings of high altitude	
Experimental aerodynamic facilities of the Aerodynamics	unmanned aerial vehicle and basic properties of	
Research and Concepts Assistance Branch [AD-A247489] p 883 N92-28248	thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437	
Expand turbulence laboratory facilities to meet new DOD	Unsteady aerodynamics of a Wortmann wing at low	
research interest	Reynolds numbers p 810 A92-46778 Navier-Stokes predictions for the F-18 wing and fuselage	
[AD-A248581] p 883 N92-28388 The design of test-section inserts for higher speed	at large incidence p 810 A92-46783	
aeroacoustic testing in the Ames 80- by 120-foot wind	Wing leading edge design with composites to meet bird	
tunnel [NASA-TM-103915] p 927 N92-28909	strike requirements p 848 A92-47404 The role of nonmetallic fasteners in aircraft wings and	
Turbulent spot generation and growth rates in a transonic	other composite structures p 784 A92-47413	
boundary layer	Probability analysis of structure failure for the wings with main and subordinate components p 848 A92-47657	
[AD-A250221] p 909 N92-29118 Buffet test in the National Transonic Facility	Integrating aerodynamics and structures in the minimum	
[NASA-CR-189595] p 888 N92-29352	weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435	
WIND VELOCITY Microburst modelling and eagling in 915, A02 45352	Turbulence modeling: Survey of activities in Belgium and	
Microburst modelling and scaling p 915 A92-46262 WIND VELOCITY MEASUREMENT	the Netherlands, and appraisal of the status and a view on the prospects	
Potential applications of laser Doppler anemometry for	[NLR-TP-90184-U] p 908 N92-28694	
in-flight measurements {NLR-TP-90163-U} p 859 N92-28654	Reduction and analysis of F-111C flight data	
WINDS ALOFT	[AD-A250341] p 853 N92-28771	

p 856 A92-46792

measuring

for

[NASA-CR-190570]

Computation of three-dimensional effects on two dimensional wings | NASA-CR-190576 | p 832 N92-29691 RING Integrated wiring system SAE PAPER 912058] p 897 A92-45440 Relative energy concepts in helicopter dynamics p 846 A92-46925 ORKING FLUIDS Power economy in high-speed wind tunnels by choice of working fluid and temperature p 881 A92-45275 Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791

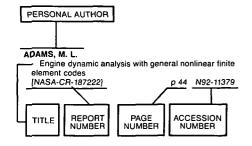
ORKLOADS (PSYCHOPHYSIOLOGY) Integrated flight control systems - Architectural considerations for future aircraft concepts p 872 A92-45322 DRKSTATIONS Operational evaluation of a tower workstation for learance delivery p 879 A92-44981 clearance delivery X RAY ANALYSIS Nondestructive inspection perspectives p 915 N92-30121 RAY DETECTORS Airport X-ray screening technology becomes a viable explosives detector p 836 A92-47925 AY INSPECTION Airport X-ray screening technology becomes a viable explosives detector p 836 A92-47925 9 AIRCRAFT Update of the X-29 high-angle-of-attack program
SAE PAPER 912006] p 783 A92-45407
X-29 H-infinity controller synthesis p 873 A92-46749 Υ An experimental investigation on aft bypass supersonic nlet performance at high angle of attack and yaw p 862 A92-48268 Helicopter low-speed yaw control NASA-CASE-LAR-14219-1] p 879 N92-30025 WING MOMENTS Forebody vortex control using small, rotatable strakes p 811 A92-46798

WINDS ALOFT

atmospheric wind profiles

Airdata calibration techniques

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence.

ABBOTT, W.

Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318

ABDELRAHMAN, M. M.

Aircraft spoiler effects under wind shear [AIAA PAPER 92-2642] p 79

ABDOL-HAMID, KHALED S.

p 796 A92-45509

Commercial turbofan engine exhaust nozzle flow analyses using PAB3D

[AIAA PAPER 92-2701] p 801 A92-45543

Grid adaptation to multiple functions for applied p 817 aerodynamic analysis A92-47045

ABOLHASSANI, J. S.

Grid generation and compressible flow computations about a high-speed civil transport configuration

p 919 A92-47055

ABOOSAIDI, FRED

Computational fluid dynamics applications in airplane abin ventilation system design [SAE PAPER 911992] p 788 A92-45394

ACHAR, N. S.

Computational aspects of helicopter trim analysis and damping levels from Floquet theory p 875 A92-46933

ADAMS, FREDERICK C., JR.

Improving the LAMP Mk 3 SH-60B HF communication

[ÁD-A245970] p 910 N92-29344

ADDINGTON, GREGORY A.

Static and dynamic flow field development about a norous suction surface wing

[AIAA PAPER 92-2628] p 795 A92-45500

Two-stream, supersonic, wake flowfield behind a thick p 813 A92-46895 base. I - General features

ADIBHATLA, SHRIDER

Intelligent Engine Control (IEC)
[AIAA PAPER 92-3484] p 866 A92-49024

ADVANI. S.

An evaluation of IFR approach techniques: Generic helicopter simulation compared with actual flight p 886 N92-28550

ADVANI, S. K.

The basic research simulator programme and the industrial and aerospace community: Opportunities for cooperative research p 887 N92-28579

AESCHLIMAN, DANIEL P.

computational/experimental aerodynamics research on a hypersonic vehicle. I - Experimental results p 812 A92-46890

AFFES, H.

The unsteady interaction of a 3-dimensional vortex p 813 A92-46934 filament with a cylinder

AGARWAL R. K.

A compact higher order Euler solver for unstructured grids with curved boundaries p 807 A92-45590 [AIAA PAPER 92-2696]

Compact higher order characteristic-based Euler solver p 812 A92-46889 for unstructured grids

AGRAWAL, S.

Design load predictions on a fighter-like aircraft wing p 811 A92-46797

AGRAWAL, SHREEKANT

A numerical study of control surface buzz using computational fluid dynamic methods [AIAA PAPER 92-2654] p 806 A92-45578

AHMED, S. A.

Swirl number effects on confined flows in a model of dump combustor p 896 A92-45202

AHMED, SYED R.

A Mach-scaled powered model for rotor-fuselage interactional aerodynamics and flight mechanics investigations p 847 A92-46960

AIKEN, ĚDWIN W.

Rotorcraft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for the 1990's p 853 N92-28926

[NASA-TM-103873]

AINSCOW, K. Evolution of ASTOVL aircraft design

p 842 A92-45311

AITCHESON, KENT ROBERT Stability and control flight testing of a half-scale Pioneer remotely piloted vehicle p 879 N92-28801

IAD-A2459731 AL-BAHI, A. M.

Aircraft spoiler effects under wind shear

[AIAA PAPER 92-2642] p 796 A92-45509

ALAPHILIPPE, M. Feasibility study of clinometric hypersonic

measurements at R3Ch [ONERA-RSF-136/1865-AY-728-] p 829 N92-28789

C-141 and C-130 power-by-wire flight control systems p 876 A92-48493

ALEKSANDROV, E. L.

Oscillations of balloon-flight altitude p 836 A92-46660

ALFANO, SALVATORE

Two variations of certainty control

p 918 A92-46762 ALLMAN, MICHAEL G.

Filament winding of composite isogrid fuselage structures p 784 A92-47405

Aluminides modified by palladium - Protection of new parts by local finishing

ONERA, TP NO. 1992-491 p 893 A92-48610

ALVES, DANIEL F., JR.

Global Positioning System telecommand link p 839 A92-47566

AMATUCCI, V. A.

Two-stream, supersonic, wake flowfield behind a thick base. I - General features p 813 A92-46895 AMES, GREGORY H.

Multi-channel fiber optic rotary joint for single-mode

IAD-D0152731 p 927 N92-29095

AMUEDO, KURT C. Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept

p 860 A92-45316

ANDERSON, BERNHARD H.

Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced Navier-Stokes code

[AIAA PAPER 92-2700] p 800 A92-45542 Comparative study of turbulence models in predicting hypersonic inlet flows

[AIAA PAPER 92-3098] p 824 A92-48740 ANDERSON, JOHN A.

Variable displacement electro-hydrostatic actuator

p 876 A92-48492 ANDERSON, JOHN D., JR.

Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects

[AIAA PAPER 92-2920] p 821 A92-47892 ANDERSON, SETH B.

Jet-powered V/STOL aircraft - Lessons learned p 841 A92-45304

ANDERSON, WILLIAM

Internationalization of telemetry systems

p 920 A92-47535 ANDERSON, WILLIAM J.

Wing mass formula for subsonic aircraft

p 845 A92-46812

ANDERSON, WILLIAM P. Fiber optic controls for aircraft engines - Issues and

implications p 856 A92-46244 ANDES, ROBERT C., JR.

Specification of adaptive aiding systems - Information requirements for designers p 916 A92-44915

ANDO. SHIGENORI

Analysis of motion of airfoil flying over wavy-wall surface (lifting surface method) p 818 A92-47100 ANDREWS, ROGER

Rapid systems integration of navigation avionics

p 858 A92-48473

ANGEL, R. G. A.

Ground surface erosion - British Aerospace test facility and experimental studies p 881 A92-45323

ANNIS, CHARLES

Fatigue in single crystal nickel superalloys [AD-A248190] p 896 N92-29408

ANSELL, HANS

A manufacturer's approach to ensure long term

structural integrity p 838 N92-30133 APONSO, BIMAL L.

Effects of cockpit lateral stick characteristics on handling

qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584 ARASHI, KAZUO

Numerical simulation of a supersonic jet impingement on a ground

[SAE PAPER 912014] p 789 A92-45412

ARCILLA, A. S.

Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991

[ISBN 0-444-88948-5] p 918 A92-47035

ARIN, KEMAL Current DOT research on the effect of multiple site damage on structural integrity p 913 N92-30112

ARMANDO, A. AM-X flight simulator from engineering tool to training

p 884 N92-28536 ARMANIOS, ERIAN A.

Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940

ARMISTEAD, MICHAEL A.

Second-order shock-expansion theory extended to include real gas effects

IAD-A2471911 ARRINGTON, E. ALLEN

Flow quality studies of the NASA Lewis Research Center 8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel

[NASA-TM-105417] p 887 N92-28673

ASAY, A. A. Utility of ground simulation in flight control problem identification, solution development, and verification

p 883 N92-28525

p 831 N92-29539

ASBURY, SCOTT C. PERSONAL AUTHOR INDEX

ASBURY, SCOTT C. Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg p 877 A92-48737 [AIAA PAPER 92-3095] ASH, ROBERT L. Viscous effects on a vortex wake in ground effect p 907 N92-28361 [NASA-CR-190400] ASHBY, DALE L. Large-scale wind tunnel studies of a jet-engined powered p 842 A92-45313 ejector-lift STOVL aircraft ASHBY, R. L. A USAF assessment of STOVL fighter options p 842 A92-45310 ASHLEY, STEVEN Safety in the sky - Designing bomb-resistant baggage containers p 836 A92-47775 ASHTON, LARRY J. Filament winding of composite isogrid fuselage p 784 A92-47405 structures ASO, SHIGERU Numerical simulations of separated flows around oscillating airfoil for dynamic stall phenomena p 788 A92-45393 [SAE PAPER 911991] Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows p 791 A92-45428 ISAE PAPER 9120441 ASO. SHIGHERU Numerical experiments on unsteady shock reflection processes using the thin-layer Navier-Stokes equations ATENCIO, ADOLPH, JR. The use of ground based simulation for handling qualities p 885 N92-28545 research: A new assessment AULEHLA, FELIX Calibration-related pseudo-Reynolds number trends in transonic wind tunnels p 882 A92-46780 AVITAL, GAVRIEL The External Propulsion Accelerator - Scramjet thrust without interaction with accelerator barrel p 866 A92-49098 [AIAA PAPER 92-3717] AYER, T. C. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 823 A92-48723 Forebody vortex control for suppressing wing rock on a highly-swept wing configuration [AIAA PAPER 92-2716] p 803 A92-45555 **BABA, SHIGEO** Replacement of the NAL high pressure air storage JNAL-TM-6341 p 888 N92-28835 BABER, BURL B. High-temperature miniaturized turbine engine lubrication system simulator (AD-A2492591 p 868 N92-28294 BAGAL A. A study of rotor wake development and wake/body interactions in hover p 813 A92-46935 BAILEY, F. R. Future directions in computing and CFD p 917 A92-45489 [AIAA PAPER 92-2734] BÀILEY, P. J. The experimental and computational study of jet impingement flowfields with reference to VSTOL aircraft p 787 A92-45324 performance BAKER, TIMOTHY J. Single block mesh generation for a fuselage plus two p 817 A92-47054 lifting surfaces BALAKUMAR, P. Discrete modes and continuous spectra in supersonic p 809 A92-46264 boundary layers BALAS, GARY J. Feedback control laws for highly maneuverable aircraft p 879 N92-29654 BANDOU, TOSHIO Aerodynamic characteristics obtained from alpha sweep test of the quiet STOL experimental aircraft ASKA p 853 N92-28901 [NAL-TR-1112] BANSAI, I. Compensating for manufacturing and life-cycle variations in aircraft engine control systems p 868 A92-49139 | AIAA PAPER 92-3869 | BARBER, T. J. Eigenfunction analysis of turbulent mixing phenomena p 898 A92-45826 BARFIELD, WOODROW Perspective versus plan view air traffic control (ATC) displays - Survey and empirical results

BARTELDS, G. BARWICK, M. BASSI, F. cascades splines BATINA, J. T. BATINA, JOHN T. BAUCH, T. BÀUCHAU, O. A. BAUGHMAN, J. BAYSAL, OKTAY BECKER, K. aircraft BECKETT, PETER Comparison with flight BECKWITH, IVAN E. Gortler instability and supersonic quiet nozzle design BENCHERIFA, B. Experimental and numerical study of flow around helicopter rotor blade tips BENCIC, TIMOTHY J. Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept BENGELINK, RONALD L. The impact of CFD on the airplane design process -

BARNES, TERENCE J. BENNER, ROBERT H. Status of the FAA flight loads monitoring program Suppression of fatigue-inducing cavity acoustic modes p 914 N92-30113 p 925 A92-46809 in turbofan engines BENNETT, C. T. Development of an efficient analysis for high Reynolds A re-analysis of the causes of Boeing 727 'black hole number inviscid/viscid interactions in cascades p 833 A92-44985 landing' crashes [AIAA PAPER 92-3073] p 823 A92-48723 BENSON, L. J. BARRIE, DOUGLAS Operational noise data for OH-58D Army helicopters p 783 A92-44895 Assembling the future p 926 N92-28292 IAD-A2468221 BENSON, RUSTY A. Ageing aircraft research in the Netherlands Numerical simulations using a dynamic solution-adaptive p 838 N92-30129 grid algorithm, with applications to unsteady internal BARTHELEMY, JEAN-FRANCOIS M. flows Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [AIAA PAPER 92-2719] p 803 A92-45557 BENT, JOHN INASA-TM-107586] p 850 N92-28435 A training program for airline line instructors BARTLER, TOMASZ p 835 A92-45044 A new method of helicopter rotor blade motion control BERCHTOLD, G. p 875 A92-47786 Concurrent engineering in design of aircraft structures MBB-FE-2-S-PUB-472| BARTOSH, BRADY J. p 854 N92-29650 Use of a commercially available flight simulator during BERECZ. IMRE aircrew performance testing The role of nonmetallic fasteners in aircraft wings and [AD-A245922] p 883 N92-28407 other composite structures p 784 A92-47413 BERGER, HAIM Liquid flow-through cooling for avionics applications Modern techniques for monitoring airborne telemetry p 902 A92-48448 ρ 857 A92-47560 BERGLIND, TORSTEN Numerical computations of transonic flows through Generation of efficient multiblock grids for Navier-Stokes computations p 919 A92-47081 [AIAA PAPER 92-3041] p 822 A92-48702 BERTHOLD, J. W. Absolute fiber optic pressure transducer for aircraft air Prediction of laminar boundary layer using cubic data measurement p 858 A92-48501 BERTIN, D. AIAA PAPER 92-2702] p 801 A92-45544 A new automatic grid generation environment for CFD applications Temporal adaptive Euler/Navier-Stokes algorithm [AIAA PAPER 92-2720] p 803 A92-45558 involving unstructured dynamic meshes BETHKE, KARL-HEINZ p 812 A92-46887 Global and high resolution radar cross section measurements and two-dimensional microwave images of Spatial and temporal adaptive procedures for the a scaled aircraft model from the type Airbus A 310 [DLR-MITT-91-10] unsteady aerodynamic analysis of airfoils using p 911 N92-29877 unstructured meshes BETTNER, J. L. [AIAA PAPER 92-2694] p 800 A92-45540 High speed rotorcraft propulsion concepts to control Spatial and temporal adaptive procedures for the power/speed characteristics unsteady aerodynamic analysis of airfoils using [AIAA PAPER 92-3367] p 865 A92-48940 unstructured meshes BÈUTH. J. L., JR. p 831 N92-29445 INASA-TM-1076351 Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins Space Shuttle Orbiter auxiliary power unit status p 913 N92-30111 [SAE PAPER 912060] p 889 A92-45442 Concepts for the stability analysis of NLF-experiments On the choice of appropriate bases for nonlinea on swept wings I AIAA PAPER 92-27061 dynamic modal analysis p 847 A92-46927 p 801 A92-45548 BAUCHAU, OLIVIER A. BIESIADNY, THOMAS J. Dynamic analysis of rotor flex-structure based on Contingency power for a small turboshaft engine by using water injection into turbine cooling air [NASA-TM-105680] nonlinear anisotropic shell models p 899 A92-46946 p 871 N92-29661 Alleviation of side force on tangent-ogive forebodies BIEZAD, DANIEL J. using passive porosity The propulsive-only flight control problem [AIAA PAPER 92-2711] p 802 A92-45552 p 876 A92-48487 Natural flow wing BILGEN, E. [NASA-CASE-LAR-14281-1] p 829 N92-28729 Effect of throat contouring on two-dimensional converging-diverging nozzles using URS method Space Shuttle Orbiter auxiliary power unit status [AIAA PAPER 92-2659] p 797 A92-45520 [SAE PAPER 912060] p 889 A92-45442 BILLIG. F. S. BAUMBICK, ROBERT Propulsion systems from takeoff to high-speed flight Potential for integrated optical circuits in advanced p 889 A92-46428 aircraft with fiber optic control and monitoring systems BILLONNET, G. p 856 A92-46246 on a turbine stator Aerodynamic design optimization using sensitivity I AIAA PAPER 92-30421 analysis and computational fluid dynamics BIRCKELBAW, L. D. [NASA-CASE-LAR-14815-1-CU] p 910 N92-29830 and grid generation [NASA-CP-10092] Simulation of transonic flow over twin-jet transport BIRCKELBAW, LARRY D. p 811 A92-46793 High speed aerodynamics of upper surface blowing aircraft configurations Interactive algebraic mesh generation for twin jet p 817 A92-47064 transport aircraft [AIAA PAPER 92-2611] BIRD, VICTOR J. Effective cueing during approach and touchdown: p 886 N92-28552

Comparison between two 3D-NS-codes and experiment p 822 A92-48703 NASA Workshop on future directions in surface modeling p 831 N92-29625

p 793 A92-45485

BITTNER, R. D.

p 813 A92-46902

p 814 A92-46948

p 860 A92-45316

p 788 A92-45391

Today and tomorrow

|SAE PAPER 911989|

p 896 A92-44967

Fiber-optic pressure sensor system for gas turbine ngine control p 857 A92-48047 engine control A comparative study of scramiet injection strategies for

high Mach numbers flows I AIAA PAPER 92-3287 | p 904 A92-48876 BJARKE, LISA J. Water tunnels p 880 A92-45266

BLACODON, D. Acoustic spinning-mode analysis by iterative threshold

method applied to a helicopter turboshaft engine IONERA, TP NO. 1992-41] p 926 A92-48602 BLANCHARD, A. The design and testing of an airfoil with hybrid laminar

flow control [ONERA, TP NO. 1992-22] p 822 A92-48585

7 27100711127107770711112271		
BLANDFORD, C. S.	BRAMSKI, STEFAN	BUGGEIN, RICHARD C.
High speed rotorcraft propulsion concepts to control	Selected models of aircraft navigation space	Three-dimensional blade vortex interactions
power/speed characteristics [AIAA PAPER 92-3367] p 865 A92-48940	p 839 A92-45373 BRANDECKER, B.	p 815 A92-46953 BURNETT, MERIDYTH S.
BLISS, DONALD B.	Ageing airplane repair assessment program for Airbus	Perspective versus plan view air traffic control (ATC)
Efficient high-resolution rotor wake calculations using	A300 p 838 N92-30123	displays - Survey and empirical results
flow field reconstruction p 814 A92-46951	BRANTLEY, A. S.	p 896 A92-44967 BURNHAM, E. A.
BLOOMFIELD, JOHN R. Knowledge-sensitive task manipulation - Acquiring	Partitioned software support concept for modular embedded computer software p 922 A92-48518	High spatial resolution measurements of ram accelerator
knowledge from pilots flying a motion-based flight	BRASCHE, LISA J. H.	gas dynamic phenomena
simulator p 916 A92-45064	NDE research efforts at the FAA Center for Aviation	[AIAA PAPER 92-3244] p 903 A92-48844
BLOSCH, EDWIN Numerical simulation of a confined transonic normal	Systems Reliability p 914 N92-30119	BURNS, JOHN Electric power generating system for the Boeing 777
shock wave/turbulent boundary layer interaction	BRASE, LARRY O.	airplane
[AIAA PAPER 92-3668] p 826 A92-49088	A numerical study of control surface buzz using computational fluid dynamic methods	[SAE PAPER 912050] p 861 A92-45434
BOBO, STEPHAN N. Current DOT research on the effect of multiple site	[AIAA PAPER 92-2654] p 806 A92-45578	BURROWS, LINDA M. Electromechanical systems with transient high power
damage on structural integrity p 913 N92-30112	BRENNER, G.	response operating from a resonant AC link
BOCKELIE, MICHAEL J.	Numerical simulation of chemical and thermal	[NASA-TM-105716] p 870 N92-28985
An adaptive grid method for computing the high speed	nonequilibrium flows behind compression shocks [AIAA PAPER 92-2879] p 820 A92-47860	BURSEY, ROGER, JR.
3D viscous flow about a re-entry vehicle [AIAA PAPER 92-2685] p 799 A92-45534	BREWER, JOHN C.	Rotor support for the STME oxygen turbopump [AIAA PAPER 92-3282] p 904 A92-48872
BOERSTOEL, J. W.	Current DOT research on the effect of multiple site	BURSTEIN, N. M.
The design of a system of codes for industrial	damage on structural integrity p 913 N92-30112	Assessment of valve actuator motor rotor degradation
calculations of flows around aircraft and other complex	BRICE, J. M. What is an ASIC? p 859 N92-28377	by Fourier Analysis of current waveform 1DE92-013233 p 909 N92-28814
aerodynamic configurations [AIAA PAPER 92-2619] p 917 A92-45492	BRITT, VICKI O.	[DE92-013233] p 909 N92-28814 BUSCH, HAUKE
New concepts for multi-block grid generation for flow	Damaged stiffened shell research at NASA. Langley	Visualization of stopping flow over airfoils
domains around complex aerodynamic configurations	Research Center p 914 N92-30115	[AIAA PAPER 92-2730] p 804 A92-45564
p 817 A92-47079 Development and validation of a characteristic boundary	BROATCH, S. A.	BUSHNELL, D. M. High-Reynolds-number test requirements in low-speed
condition for a cell-centered Euler method	An integrated navigation system manager using federated Kalman filtering p 858 A92-48477	aerodynamics p 787 A92-45263
[NLR-TP-90144-U] p 828 N92-28692	BROCKETT, TERRY	BUSSOLARI, STEVEN R.
BOETTCHER, JAN Jet aircraft noise at high subsonic flight Mach	Some exact and numerical results for plane steady	Real-time control tower simulation for evaluation of
numbers	sheared flow of an incompressible inviscid fluid	airport surface traffic automation p 879 A92-44976 BUTLER, BRETT E.
[DLR-FB-91-28] p 928 N92-29997	p 821 A92-48019 BROEK, DAVID	Flight model for unmanned simulated helicopters
BOGDONOFF, S. M.	Generation of spectra and stress histories for fatigue	p 874 A92-46776
Interaction between crossing oblique shocks and a turbulent boundary layer p 812 A92-46882	and damage tolerance analysis of fuselage repairs	BUTLER, THOMAS W.
BOLONKIN, ALEXANDER	[AD-A250390] p 854 N92-29180	Buffet test in the National Transonic Facility [NASA-CR-189595] p 888 N92-29352
Aviation, motor, and space designs	BROOKS, N. KENT	BUYUKATAMAN, K.
p 784 A92-46202	Loran-C performance assurance assessment program	Design criteria and analysis of the dynamic behavior
DOND THOMAC H	11YASA-CH-19U4091 D 64U 1N92-287 IB	besign enteria and analysis of the dynamic behavior
BOND, THOMAS H. Experimental and computational ice shapes and	[NASA-CR-190469] p 840 N92-28718 BROSIUS, DALE	of high speed, heavily loaded and precision epicyclic gears
BOND, THOMAS H. Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil	BROSIUS, DALE Resin transfer molding of a complex composite aircraft	of high speed, heavily loaded and precision epicyclic gears for aircraft use
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410	of high speed, heavily loaded and precision epicyclic gears
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] p 906 A92-49028
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels	of high speed, heavily loaded and precision epicyclic gears for aircraft use
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600	of high speed, heavily loaded and precision epicyclic gears for aircraft use AIAA PAPER 92-3491 p 906 A92-49028
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] p 906 A92-49028
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] p 906 A92-49028 C CABATO, NELLIE L.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoll [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of response of spiral bevel	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airGol [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC)	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airGol [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC)	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p 921 A92-48489 CAMARERO, R.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936	Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA - The R5 and F4 wind tunnels [ONERA - The R5 and F4 wind tunnels] [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p 921 A92-48489 CAMARERO, R. Interactive generation of structured/unstructured
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airGoll [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR.	Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-32444] p 903 A92-48844	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines P 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity P 919 A92-47666
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3844] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p. 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p. 919 A92-47066 CAMCI, C.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoll [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434	Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p837 N92-28530	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines P 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity P 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoll [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p 883 A92-48908
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines P 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I Design development and performance of the research facility [AIAA PAPER 92-3325] P 883 A92-48908 CAMPBELL, R. L.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORAI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p 883 A92-48908 CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V.	Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA - The R5 and F4 wind tunnels [ONERA - The R5 and F4 wind tunnels] [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825 BRYKINA, I. G.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p. 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p. 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p. 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p. 921 A92-48489 CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p. 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p. 883 A92-48908 CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p. 797 A92-45518
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity P 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I- Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] P 797 A92-45518 CANDLER, GRAHAM V.
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 950 A92-48936 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] P 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] P 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] P 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] P 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] P 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] P 899 A92-46825 BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p. 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p. 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p. 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p. 921 A92-48489 CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p. 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p. 883 A92-48908 CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p. 797 A92-45518
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3368] p 955 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984 BOWLES, T.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure P 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows P 827 A92-49188 BRYSON, A. E.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines P 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity P 919 A92-47666 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] P 797 A92-45518 CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] P 892 A92-47835
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 950 A92-48936 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] P 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] P 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] P 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] P 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] P 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] P 899 A92-46825 BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control P 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines P 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems P 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity P 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] P 797 A92-45518 CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] P 892 A92-47835 Examination of ultraviolet radiation theory for bow shock
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984 BOWLES, T. Active control of blade vortex interaction p 814 A92-46944 BOYCE, REX A.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure P 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows P 827 A92-49188 BRYSON, A. E. Approach guidance in a downburst P 873 A92-46741 Parameter identification of linear systems based on	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] Examination of ultraviolet radiation theory for bow shock rocket experiments
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984 BOWLES, T. Active control of blade vortex interaction p 814 A92-46944 BOYCE, REX A. Bearing servicing tool	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-26530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825 BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows p 827 A92-49188 BRYSON, A. E. Approach guidance in a downburst P 873 A92-46741 Parameter identification of linear systems based on smoothing p 873 A92-46742	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p 921 A92-48489 CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984 BOWLES, T. Active control of blade vortex interaction p 814 A92-46944 BOYCE, REX A.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825 BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows p 827 A92-49188 BRYSON, A. E. Approach guidance in a downburst Parameter identification of linear systems based on smoothing p 873 A92-46742 BRYSON, ARTHUR E., JR.	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] Examination of ultraviolet radiation theory for bow shock rocket experiments
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48984 BOWLES, T. Active control of blade vortex interaction p 814 A92-46944 BOYCE, REX A. Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 BOYD, IAIN D. Decoupled predictions of radiative heating in air using	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure p 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556 BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] p 906 A92-49031 BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] p 866 A92-49024 BRUCKNER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-26530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825 BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows p 827 A92-49188 BRYSON, A. E. Approach guidance in a downburst P 873 A92-46741 Parameter identification of linear systems based on smoothing p 873 A92-46742	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] p 906 A92-49028 C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems p 921 A92-48489 CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p 883 A92-48908 CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518 CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47635 Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CAO, HOA V. Three-dimensional orthogonal-to-surface structured grid generation with transonic Navier-Stokes flow solutions for
Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil [NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis [NASA-TM-105745] p 828 N92-28696 BONDIE, LILLY Systems simulation of an advanced avionics COMSEC unit p 921 A92-48485 BONDURANT, DAVID W. Ferroelectric memory evaluation and development system p 902 A92-48460 BORAY, R. S. Swirl number effects on confined flows in a model of a dump combustor p 896 A92-45202 BOROWSKI, RICHARD A. Piloted simulation effectiveness development applications and limitations p 883 N92-28524 BORRI, MARCO Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936 BOSSLER, R. B., JR. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 BOSSLER, ROBERT B., JR. Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 An eight month gearbox development program [AIAA PAPER 92-3368] p 850 A92-48941 BOWLES, JEFFREY V. Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425] p 865 A92-48948 BOWLES, T. Active control of blade vortex interaction p 814 A92-46944 BOYCE, REX A. Bearing servicing tool [NASA-CASE-MSC-21881-1] p 912 N92-30082 BOYD, IAIN D.	BROSIUS, DALE Resin transfer molding of a complex composite aircraft structure P 784 A92-47410 BROUSSAUD, P. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] BROWN, DAVID Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] BROWN, F. W. Analytical evaluation of resonant response of spiral bevel gears in the RAH-66 helicopter Fantail transmission [AIAA PAPER 92-3495] BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] BROWN, HAROLD Intelligent Engine Control (IEC) [AIAA PAPER 92-3484] BRUKKER, A. P. High spatial resolution measurements of ram accelerator gas dynamic phenomena [AIAA PAPER 92-3244] BRUNNER, MICHAEL T. Use of high-fidelity simulation in the development of an F/A-18 active ground collision avoidance system p 837 N92-28530 BRYANSTON-CROSS, P. J. The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] BRYKINA, I. G. Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows P 827 A92-49188 BRYSON, A. E. Approach guidance in a downburst P 873 A92-46741 Parameter identification of linear systems based on smoothing P 873 A92-46742 BRYSON, ARTHUR E., JR. Linear quadratic minimax controllers	of high speed, heavily loaded and precision epicyclic gears for aircraft use [AIAA PAPER 92-3491] C CABATO, NELLIE L. Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047 CAI, JUN-XIAN Basic analysis of counter-rotating turbines p 862 A92-47692 CAI, YIN-LIN Approximate analysis for failure probability of structural systems p 901 A92-47671 CALANDRA, VINCENT P. Applying advanced digital simulation techniques in designing fault tolerant systems CAMARERO, R. Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 CAMCI, C. Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] CAMPBELL, R. L. Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] CANDLER, GRAHAM V. Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] P 901 A92-47853 CAO, HOA V. Three-dimensional orthogonal-to-surface structured grid

and polynomial classifier [DLR-FB-91-34]

Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 BUCKREUSS, STEFAN

Motion errors in an airborne synthetic aperture radar ystem p 840 A92-48416

BUCHHOLZ, MARK D.

system

Mixing in the dome region of a staged gas turbine

BRAGG, M. B.

LOV measurements on a rectangular wing with a

p 903 A92-48734

p 800 A92-45537

combustor [AIAA PAPER 92-3089]

simulated glaze ice accretion [AIAA PAPER 92-2690]

p 906 A92-49085

p 808 A92-45598

CAPLIN, J.

combustor [AIAA PAPER 92-3654]

wing-body at angle of attack [AIAA PAPER 92-2729]

A new vane swirler as applied to dual-inlet side-dump

Measurements of the unsteady vortex flow over a

p 859 N92-29870

p 796 A92-45508

	A	0110 0 11 11
CAPONE, F.	CHAN, WAI Y.	CHOO, Y. K.
Comparative investigation of multiplane thrust vectoring nozzles	Aeromechanical stability of hingeless helicopter rotors in forward flight p 874 A92-46923	NASA Workshop on future directions in surface modeling and grid generation
[AIAA PAPER 92-3263] p 864 A92-48858	CHANA, WILLIAM F.	INASA-CP-10092 p 831 N92-29625
CAPONE, FRANCIS J.	High speed VSTOL on the horizon - The answer to	CHOPRA, INDERJIT
Thrust vectoring characteristics of the F-18 high alpha	congestion?	Aeromechanical stability of hingeless helicopter rotors
research vehicle at angles of attack from 0 to 70 deg	[SAE PAPER 911976] p 843 A92-45383	in forward flight p 874 A92-46923
[AIAA PAPER 92-3095] p 877 A92-48737	CHANDRAN, RAVI	CHOU, J. H.
CARADONNA, F. X.	Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790	Nonuniform motion of leading-edge vortex breakdown
Experimental and computational studies of hovering	CHANETZ, B.	on ramp pitching delta wings p 808 A92-45828 CHOU, MS.
rotor flows p 815 A92-46954	New hypersonic test methods developed at ONERA -	Laser-initiated conical detonation wave for supersonic
CARLILE, JULIE A. An experimental investigation of high-aspect-ratio	The R5 and F4 wind tunnels	combustion. III
cooling passages	[ONERA, TP NO. 1992-39] p 882 A92-48600	[AIAA PAPER 92-3247] p 893 A92-48846
[AIAA PAPER 92-3154] p 890 A92-48780	CHANG, JEN-FU	CHOUDHURY, DIPANKAR
CARLSON, JOHN R.	Minimizing supersonic wave drag with physical	Computational fluid dynamics applications in airplane
Commercial turbofan engine exhaust nozzle flow	constraints at design and off-design Mach numbers p 811 A92-46808	cabin ventilation system design
analyses using PAB3D	CHANG, R. C.	[SAE PAPER 911992] p 788 A92-45394 CHPOUN, A.
[AIAA PAPER 92-2701] p 801 A92-45543	Nonuniform motion of leading-edge vortex breakdown	Numerical and experimental investigation of rarefied
Airborne/shipborne PSK telemetry data link	on ramp pitching delta wings p 808 A92-45828	compression corner flow
p 839 A92-47511	CHAPMAN, GARY T.	[AIAA PAPER 92-2900] p 820 A92-47876
CARLSON, LELAND A.	Streamlines, vorticity lines, and vortices around	CHRISTODOULOU, L.
Determination of aerodynamic sensitivity coefficients based on the three-dimensional full potential equation	three-dimensional bodies p 808 A92-45845	Axial alignment of short-fiber titanium aluminide
[AIAA PAPER 92-2670] p 798 A92-45525	CHAPPELL, SHERYL L.	composites by directional solidification
Determination of aerodynamic sensitivity coefficients for	Who or what saved the day? A comparison of traditional and glass cockpits p 833 A92-44931	p 892 A92-46838
wings in transonic flow	CHATRENET, D.	CHUA, KIAT A fast three-dimensional vortex method for unsteady
[NASA-CR-190570] p 832 N92-29657	Flight simulation and digital flight controls	wake calculations
CARON, P.	p 884 N92-28526	[AIAA PAPER 92-2624] p 794 A92-45496
Advanced superalloys for turbine blade and vane	CHEN, C. L.	CHUPP, RAYMOND E.
applications	Scale effects on the flow past the mated Space Shuttle	Simple effective thickness model for circular brush
[ONERA, TP NO. 1992-2] p 893 A92-48578	configuration [AIAA PAPER 92-2680] p 799 A92-45532	seals
CARRAWAY, DEBRA L. Active thermal isolation for temperature responsive	[AIAA PAPER 92-2680] p 799 A92-45532 CHEN, CHUAN-YAO	[AIAA PAPER 92-3192] p 903 A92-48803 CLARK, J. P.
sensors	Economic life analysis for replacing components	Turbulent spot generation and growth rates in a transonic
[NASA-CASE-LAR-14612-1] p 911 N92-29954	p 785 A92-47670	boundary layer
CARRIER, ALAIN	CHEN, FANG-JENG	[AD-A250221] p 909 N92-29118
Linear quadratic minimax controllers	Gortler instability and supersonic quiet nozzle design	CLEM, B. C.
p 917 A92-46748	p 813 A92-46902	Recent CFD applications on jet transport
CARRIER, G. F.	CHEN, FU-QUN	configurations
Laser-initiated conical detonation wave for supersonic combustion. III	A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial	[AIAA PAPER 92-2658] p 844 A92-45519
[AIAA PAPER 92-3247] p 893 A92-48846	compressor cascades p 819 A92-47691	CLIFF, S. E. Practical design optimization of wing/body
CARRILLO, RENE	CHEN, HSUN H.	configurations using the Euler equations
Steady and transient performance calculation method	Numerical method for predicting transition in	[AIAA PAPER 92-2633] p 795 A92-45505
for prediction, analysis, and identification	three-dimensional flows by spatial amplification theory	CLIFFORD, B. R.
p 869 N92-28461	p 812 A92-46886	Harrier GR MK 5/7 mission simulators for the Royal
CARROLL, BRUCE F.	CHEN, P. C.	Air Force p 885 N92-28540
Numerical simulation of a confined transonic normal	Comment on 'Canard-wing interaction in unsteady	CODER, DAVID W.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820	CODER, DAVID W. On the measurement of subsonic flow around an
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088	Comment on 'Canard-wing interaction in unsteady	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING	CODER, DAVID W. On the measurement of subsonic flow around an
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3688] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92:3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVALLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model P 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3688] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA-The R5 and F4 wind tunnels
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92:3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C.	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92:3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design SAE PAPER 912008 p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLINS, A. T.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3688] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47099 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92:3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design SAE PAPER 912008 p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets of high-speed jets P 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence P 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] P 908 Economic life analysis for replacing components P 785 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models P 899 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes Generation of unstructured grids within a hybrid multi-block environment P 818 A92-47089 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] P 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] P 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLINS, A. T.
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis P 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47099 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A.	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92:3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels INAS-CASE-LAR-14698-1} p 911 N92-30028	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces IAIAA PAPER 92-2617 p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment (NASA-TM-103925) p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46994 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVALLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVALLER, C. The CAVACOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [INASA-CASE-LAR-14698-1] p 911 N92-30028 CHADERJIAN, NEAL M. Navier-Stokes predictions for the F-18 wing and fuselage	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets OHEN, OHING Reconstruction of flight path in turbulence P 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] P 908 Economic life analysis for replacing components P 785 CHEN, YOU-PING Economic life analysis for replacing components P 785 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes P 818 A92-47089 Generation of unstructured grids within a hybrid multi-block environment P 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] P 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight P 859 N92-28380	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 9813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airciol correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 CHADERJIAN, NEAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-45783	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 CHOI, JANGSOO	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [NAS-CASE-LAR-14698-1] p 911 N92-30028 CHADERJIAN, NEAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 CHAMBERLIN, ROY W.	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets OHEN, OHING Reconstruction of flight path in turbulence P 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] P 908 Economic life analysis for replacing components P 785 CHEN, YOU-PING Economic life analysis for replacing components P 785 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes P 818 A92-47089 Generation of unstructured grids within a hybrid multi-block environment P 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] P 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight P 859 N92-28380	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane [NASA-TM-104240] p 871 N92-29659
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVALLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [INASA-CASE-LAR-14698-1] p 911 N92-30028 CHAMBERJIAN, RAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 CHAMBERLIN, ROY W. Rejected takeoffs - Causes, problems, and	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47099 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 CHOJ, JANGSOO Aerodynamic characteristics near the tip of a finite wing	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-23747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane [NASA-TM-104240] p 871 N92-29659
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVALLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [INASA-CASE-LAR-14698-1] p 911 N92-30028 CHAMBERJIAN, RAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 CHAMBERLIN, ROY W. Rejected takeoffs - Causes, problems, and	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 819 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] P 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 CHOI, JANGSOO Aerodynamic characteristics near the tip of a finite wing by a panel method	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane [NASA-TM-104240] p 871 N92-29659
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model p 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 CHADERJIAN, NEAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 CHAMBERLIN, ROY W. Rejected takeoffs - Causes, problems, and consequences p 835 A92-45052 CHAMPAGNE, FRANK H. Expand turbulence laboratory facilities to meet new DOD	Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment (NASA-TM-103925) p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 CHOI, JANGSOO Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 91200] p 790 A92-45413 CHOKANI, NDAONA The effects of nozzle exit geometry on forebody vortex	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48555 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane [NASA-TM-104240] p 871 N92-29659 CONSTANCIS, PIERRE Wideband control of gyro/accelerometer multisensors in a strapdown guidance system p 856 A92-46736
Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction [AIAA PAPER 92-3668] p 826 A92-49088 CARTER, ALEXANDER B., III Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CARTER, J. Thin-airfoil correction for panel methods p 811 A92-46811 CASE, MICHAEL W. Use of adhesive bonded attachments for a composite aircraft fuel tank p 785 A92-47414 CASTOLDI, P. AM-X flight simulator from engineering tool to training device p 884 N92-28536 CAUGHEY, DAVID A. Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 CAVAILLER, C. The DAM vertical shock-tube p 880 A92-45096 CAVAZOS, ODILON V. Pitch rate/sideslip effects on leading-edge extension vortices of an F/A-18 aircraft model D 874 A92-46810 CEBECI, TUNCER An economic approach to accurate wing design [SAE PAPER 912008] p 789 A92-45408 Numerical method for predicting transition in three-dimensional flows by spatial amplification theory p 812 A92-46886 CELENLIGIL, M. C. Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 CERRO, JEFFREY A. Combined load test apparatus for flat panels INAS-CASE-LAR-14698-1 p 911 N92-30028 CHADERJIAN, NEAL M. Navier-Stokes predictions for the F-18 wing and fuselage at large incidence p 810 A92-46783 CHAMBERLIN, ROY W. Rejected takeoffs - Causes, problems, and consequences p 835 A92-45052	Comment on 'Canard-wing interaction in unsteady supersonic flow' CHEN, PING Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 CHEN, QING Reconstruction of flight path in turbulence p 874 A92-46777 CHEN, YJ. D. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 CHEN, YOU-PING Economic life analysis for replacing components p 785 A92-47670 CHIANG, WUYING Dynamic analysis of rotor flex-structure based on nonlinear anisotropic shell models p 899 A92-46946 CHILDS, P. N. The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089 Generation of unstructured grids within a hybrid multi-block environment p 818 A92-47090 CHIN, VINCENT D. Transonic calculations for wings with deflected control surfaces [AIAA PAPER 92-2617] p 805 A92-45572 CHIU, S. A. Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment [NASA-TM-103925] p 852 N92-28721 CHIU, Y. D. Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 CHOCHOD, A. A radar signal processing ASIC and a VME interface circuit p 859 N92-28380 CHOKANI, NDAONA	CODER, DAVID W. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 COEN, PETER G. Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 COET, MC. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 COLANTUONI, S. Numerical computations of transonic flows through cascades [AIAA PAPER 92-3041] p 822 A92-48702 COLLERCANDY, RANJIT An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations [AIAA PAPER 92-2613] p 793 A92-45487 COLLINS, D. J. X-29 H-infinity controller synthesis p 873 A92-46749 COLLINS, ROBERT J. Examination of ultraviolet radiation theory for bow shock rocket experiments [AIAA PAPER 92-2871] p 901 A92-47853 CONDRA, LLOYD Using design of experiments to improve product and process integrity p 928 A92-48595 CONLISK, A. T. The unsteady interaction of a 3-dimensional vortex filament with a cylinder p 813 A92-46934 CONNERS, TIMOTHY R. Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane [AIAA PAPER 92-3747] p 866 A92-49111 Flight evaluation of an extended engine life mode on an F-15 airplane [NASA-TM-104240] p 871 N92-29659 CONSTANCIS, PIERRE Wideband control of gyro/accelerometer multisensors in a strapdown guidance system p 856 A92-46736

COOK, JEFFREY Tensile and interlaminar properties of GLARE (trade	CZYSZ, P. Energy analysis of high-speed flight systems	DEBRY, BENOIT Measurements of the unsteady vortex flow over a
name) faminates	p 925 A92-46430	wing-body at angle of attack
AD-A250188 p 895 N92-28921 COOK, ROBERT L.	_	[AIAA PAPER 92-2729] p 808 A92-45598 DECOOK, S. J.
Laser velocimetry measurements in an MHD	D	Wake mixing and performance measurements in a linear
aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996	DACENHART I D	compressor cascade with crenulated trailing edges [AIAA PAPER 92-3188] p 824 A92-48800
COOKE, JOSEPH M.	DAGENHART, J. R. Computational study of transition front on a swept wing	DEFIORE, THOMAS
NPSNET: Flight simulation dynamic modeling using	leading-edge model	Status of the FAA flight loads monitoring program
quaternions [AD-A247484] p 923 N92-28245	[AIAA PAPER 92-2630] p 795 A92-45502 DAIGUJI, HISAAKI	p 914 N92-30113 DEGANI, ASAF
CORKE, T. C.	A higher-order accurate Navier-Stokes solver for	Who or what saved the day? A comparison of traditional
Three-dimensional-mode resonance in far wakes p 898 A92-46252	transonic and supersonic flows in turbomachinery	and glass cockpits p 833 A92-44931 DEITRICH, BRIAN
CORNUAULT, C.	[AIAA PAPER 92-3044] p 822 A92-48704 DALY, JOHN H., III	Systems simulation of an advanced avionics COMSEC
Structural optimization of aircraft p 851 N92-28472 CORSIGLIA, VICTOR	Judgement training for Alaskan pilots	unit p 921 A92-48485 DEJARNETTE, FRED R.
Large-scale wind tunnel studies of a jet-engined powered	p 835 A92-45048	Second-order shock-expansion theory extended to
ejector-lift STOVL aircraft p 842 A92-45313	DANCEY, C. L. LDA measurements in a Mach 2 flow over a rearward	include real gas effects
CORWIN, WILLIAM H. Data Link integration in commercial transport	facing step with staged transverse injection	[AD-A247191] p 831 N92-29539 DEJONGE , J. B .
operations p 839 A92-44919	[AIAA PAPER 92-2692] p 800 A92-45539 DANDO, ANDREW	Ageing aircraft research in the Netherlands
Knowledge-sensitive task manipulation - Acquiring knowledge from pilots flying a motion-based flight	The inviscid compressible Goertler problem in	p 838 N92-30129 DELANEY, R. A.
simulator p 916 A92-45064	three-dimensional boundary layers p 809 A92-46441	Vane-blade interaction in a transonic turbine. I -
COWLES, LISA Military utility of medium speed V/STOL designs	DARLING, DOUGLAS A fast, uncoupled, compressible, two-dimensional,	Aerodynamics [AIAA PAPER 92-3323] p 825 A92-48906
p 841 A92-45308	unsteady boundary layer algorithm with separation for	Vane-blade interaction in a transonic turbine. If - Heat
COX, M. E.	engine inlets [AIAA PAPER 92-3082] p 823 A92-48729	transfer
European studies to investigate the feasibility of using 1000 ft vertical separation minima above FL 290. Part 1:	Interface of an uncoupled boundary layer algorithm with	[AIAA PAPER 92-3324] p 904 A92-48907 DELEEUW, J. H.
Overview of organisation, techniques employed, and	an inviscid core flow algorithm for unsteady supersonic	An evaluation of IFR approach techniques: Generic
conclusions [NLR-TP-91062-U-PT-1] p 841 N92-29605	engine inlets [AIAA PAPER 92-3083] p 823 A92-48730	helicopter simulation compared with actual flight p 886 N92-28550
COYETTE, J. P.	DASGUPTA, SAMHITA	DELERY, JEAN M.
Ritz vectors synthesis versus modal synthesis for	Fiber optic controls for aircraft engines - Issues and	Separation and vortex formation in turbulent flows
fluid-structure interaction modeling p 898 A92-45885 CRESS. DANIEL H.	implications p 856 A92-46244	[ONERA, TP NO. 1992-7] p 822 A92-48579 DELUCA, DANIEL P.
Passive acoustic range estimation of helicopters	Design issues in a fiber optic sensor system architecture for aircraft engine control	Fatigue in single crystal nickel superalloys
[AD-A248033] p 926 N92-28302 CRISCOE, J. C.	[AIAA PAPER 92-3483] p 866 A92-49023	[AD-A248190] p 896 N92-29408 DEMARTINO, JOSEPH
Assessment of valve actuator motor rotor degradation	DASH, S. M. Progress towards the development of transient ram	Naval aircraft/engine mission payoff analyses
by Fourier Analysis of current waveform	accelerator simulation as part of the U.S. Air Force	[AIAA PAPER 92-3473] p 865 A92-49019
[DE92-013233] p 909 N92-28814 CROCKER, MALCOLM J.	Armament Directorate Research Program	DENBRAVEN, W. NARSIM: A real-time simulator for air traffic control
International Congress on Recent Developments in Air-	[AIAA PAPER 92-3248] p 904 A92-48847 DAVINSON, IAN	research
and Structure-Borne Sound and Vibration, Auburn University, AL, Mar. 6-8, 1990, Proceedings. Vols. 1 & 2	The use of optical sensors and signal processing gas	[NLR-TP-90147-U] p 888 N92-29204 DENERY, DALLAS G.
p 924 A92-45876	turbine engines p 856 A92-46247	Rotorcraft In-Flight Simulation Research at NASA Ames
New methods to determine the transmission loss of	DAVIS, D. O. Surface and flow field measurements in a symmetric	Research Center: A Review of the 1980's and plans for the 1990's
partitions using sound intensity measurements p 924 A92-45879	crossing shock wave/turbulent boundary layer flow	[NASA-TM-103873] p 853 N92-28926
CRONKHITE, JAMES D.	[AIAA PAPER 92-2634] p 806 A92-45574 DAVIS, M. W.	DEPAULA, RAMON P.
Design of helicopter composite structures for crashworthiness p 848 A92-47408	DAVIS, M. VV. DYNamic Turbine Engine Compressor Code	Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990
CROSO, H.	(DYNTECC) - Theory and capabilities	[SPIE-1367] p 901 A92-48026
The DAM vertical shock-tube p 880 A92-45096 CROSS, KENNETH D.	[AIAA PAPER 92-3190] p 923 A92-48802 DAVIS, ROGER L.	DESAI, C. Characterization of thermal performance of wheel
Assessment of army aviators' ability to perform individual	Numerical simulation of turbine 'hot spot' alleviation	outboard of an aircraft p 849 A92-48352
and collective tasks in the aviation networked simulator	using film cooling (AIAA PAPER 92-3309) p 904 A92-48896	DEUR, J. M.
[AD-A250293] p 888 N92-29709 CROWELL, CYNTHIA A.	(AIAA PAPER 92-3309) p 904 A92-48896 DAVOUDZADEH, FARHAD	A simplified reaction mechanism for prediction of NO(x) emissions in the combustion of hydrocarbons
Helicopter low-speed yaw control	Three-dimensional blade vortex interactions	[AIAA PAPER 92-3340] p 894 A92-48919
[NASA-CASE-LAR-14219-1] p 879 N92-30025 CRUSE. THOMAS A.	p 815 A92-46953 DAY, DELBERT E.	Applied analytical combustion/emissions research at the NASA Lewis Research Center
Failure model development for an integrally bladed	Fabrication and mechanical properties of an optically	[NASA-TM-105731] p 890 N92-29343
turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979	transparent glass fiber/polymer matrix composite	DEV, S. P.
CUELLAR, JOHN P.	p 891 A92-45630 DAYAL, H. M.	Emerging technologies for gas turbine engines - U.A.V. synergies
High-temperature miniaturized turbine engine lubrication system simulator	Microbiological spoilage of aviation turbine fuel. II -	[AIAA PAPER 92-3757] p 867 A92-49114
(AD-A249259) p 868 N92-28294	Evaluation of a suitable biocide p 891 A92-45600 DE LA VIUDA, JOSE M.	DI MARTINO, P. Numerical computations of transonic flows through
CUI, ER-JIE	Patch-independent structured multiblock grids for CFD	cascades
The numerical simulation of compressible flow around an airfoil at high angle of attack p 818 A92-47686	computations p 919 A92-47078 DE MATTEIS, GUIDO	[AIAA PAPER 92-3041] p 822 A92-48702
CULP, J. D.	Hang-glider response to atmospheric inputs	DIDRIKSON, S. R. Transport Canada aging aircraft activities
Free vibration analysis of branched blades by the	p 874 A92-46765	p 838 N92-30131
integrating matrix method p 847 A92-47122 CUMMINGS, RUSSELL M.	DE PRITER, KIRK Flexible manufacturing in repair of gas turbine engine	DIEHL, ALAN
Computational evaluation of an airfoil with a Gurney	components	The effectiveness of training programs for preventing aircrew 'error' p 834 A92-44997
flap	[AIAA PAPER 92-3524] p 786 A92-49049 DEARNALEY, G.	DIET, JEAN
[AIAA PAPER 92-2708] p 802 A92-45550 Navier-Stokes predictions for the F-18 wing and fuselage	Report on the workshop on Ion Implantation and Ion	Patch-independent structured multiblock grids for CFD
at large incidence p 810 A92-46783	Beam Assisted Deposition [AD-A250561] p 927 N92-28923	computations p 919 A92-47078 DINI, PAOLO
Computation of three-dimensional effects on two	DEBOER, W. P.	Simplified linear stability transition prediction method for
dimensional wings [NASA-CR-190576] p 832 N92-29691	Aircraft simulation and pilot proficiency: From surrogate	separated boundary layers p 812 A92-46883 DODDS, W.
CURRAN, E. T.	flying towards effective training p 884 N92-28532 Some longitudinal handling qualities design guidelines	A distributed vaporization time-lag model for gas turbine
High-speed flight propulsion systems [ISBN 1-56347-011-X] p 862 A92-46426	for active control technology transport aircraft	combustor dynamics
Introduction p 862 A92-46427	[NLR-TP-90129-U] p 878 N92-28652 DEBONIS, JAMES R.	{AIAA PAPER 92-3465} p 865 A92-49014 DODGE, L.
CURTIS, DAYTON	Full Navier-Stokes analysis of a two-dimensional	A distributed vaporization time-lag model for gas turbine
The FAA aging airplane program plan for transport aircraft p 838 N92-30128	mixer/ejector nozzle for noise suppression [NASA-TM-105715] p 868 N92-28419	combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014
unoran p 030 1192-30120	[HADA: 181 100110] p 000 1822-20419	(O)CC C C C C C C C C C C C C

DOEHNEL, W. PERSONAL AUTHOR INDEX

ENDOH, MASANORI

DUPONCHEL, JEAN PIERRE

Experience with piloted simulation in the development Steady and transient performance calculation method Design and off-design point characteristics of Separated of helicopters p 884 N92-28528 for prediction, analysis, and identification Core Ultra High Bypass Engine (SCUBE) p 867 A92-49120 p 869 N92-28461 Experience with piloted simulation in the development [AIAA PAPER 92-3776] DUTTON, J. C. ENNS, DALE F. Two-stream, supersonic, wake flowfield behind a thick p 889 N92-30076 [MBB-UD-0610-91-PUB] Nonlinear inversion flight control for base. I - General features p 813 A92-46895 supermaneuverable aircraft p 873 A92-46751 DOGRA, V. K. EPSTEIN, A. H. Aerothermodynamics of a 1.6-meter-diameter sphere in p 808 A92-45840 hypersonic rarefied flow Ε Dynamic control of aerodynamic instabilities in gas p 870 N92-28466 turbine engines DOLLING, D. S. Computation of turbulent, separated, unswept ERCOLINE, WILLIAM R. EASTIN, ROBERT G. The standardization of military head-up display p 813 A92-46897 compression ramp interactions System for generating sequences of phased gust or taxi symbology p 855 A92-44929 DOMINIK, D. F. p 845 A92-46800 An aircraft landing accident caused by visually induced Scale effects on the flow past the mated Space Shuttle EBERHARDT, SCOTT BUWICE - An interactive icing program applied to engine spatial disorientation p 834 A92-44993 [AIAA PAPER 92-2680] p 799 A92-45532 inlets ERDMAN, PETER W. [AIAA PAPER 92-3179] DONE, G. T. S. p 922 A92-48794 Examination of ultraviolet radiation theory for bow shock EBERLE, A. Relative energy concepts in helicopter dynamics rocket experiments p 846 A92-46925 Application of the Euler method EUFLEX to a fighter-type [AIAA PAPER 92-2871] p 901 A92-47853 airplane configuration at transonic speed DONKER, J. C. ERICSSON, L. E. [AIAA PAPER 92-2620] p 845 A92-45573 Dynamic LEX/forebody vortex interaction effects Application of knowledge-based systems for diagnosis ECCLES, E. S. [AIAA PAPER 92-2732] p 804 A92-45566 of aircraft systems INLR-TP-90192-U1 p 837 N92-28655 Applications of silicon hybrid multi-chip modules to ESCANDE, B. p 859 N92-28379 DONNELLAN, MARY E. Comparison between two 3D-NS-codes and experiment ECCLES, LEE H. Tensile and interlaminar properties of GLARE (trade on a turbine stator New Boeing flight test data acquisition systems [AIAA PAPER 92-3042] p 822 A92-48703 name) laminates p 920 A92-47537 p 895 N92-28921 [AD-A250188] ESCHBAUMER, HERMANN EDIE, JOSEPH DONNELLY, RUSSELL J. Repair procedures for advanced composites for IsoDoppler and mocomp corrections improve MTI High Reynolds number flows using liquid and gaseous helicopters p 898 A92-45774 IMBB-UD-0606-91-PUB1 helium p 787 N92-29874 EDWARDS, JACK R. [ISBN 0-387-97475-X] n 897 A92-45261 ESHOW, MICHELLE M. A nonlinear relaxation/quasi-Newton algorithm for the Rotorcraft In-Flight Simulation Research at NASA Ames DOONAN, J. G. compressible Navier-Stokes equations Scale model test results of a multi-slotted vectoring Research Center: A Review of the 1980's and plans for p 796 A92-45510 [AIAA PAPER 92-2643] 2DCD ejector nozzle the 1990's Numerical simulations using a dynamic solution-adaptive [AIAA PAPER 92-3264] p 864 A92-48859 INASA-TM-1038731 p 853 N92-28926 grid algorithm, with applications to unsteady internal DORNEY, DANIEL J. ESKER, BARBARA S. Numerical simulation of turbine 'hot spot' alleviation Internal reversing flow in a tailpipe offtake configuration [AIAA PAPER 92-2719] p 803 A92-45557 using film cooling for SSTOVL aircraft EGOLF, T. A. [AIAA PAPER 92-3309] p 904 A92-48896 INASA-TM-1056981 p 868 N92-28418 Navier-Stokes and Euler solutions for an unmanned DOVI. AUGUSTINE R. ESWARA, VENKATASAM aerial vehicle Integrating aerodynamics and structures in the minimum p 792 A92-45483 The relationship between mode localization and energy LAIAA PAPER 92-26091 weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Initial validation of an unsteady Euler/Navier-Stokes flow transmission parameters in the vibration of coupled p 925 A92-45921 structures solver for helicopter rotor airloads in forward flight DOWELL, E. H. p 815 A92-46956 EVANS. A. Chaotic oscillation in helicopter blade stall response EISEMAN, P. R. Mesh adaptivity with the quadtree method p 846 A92-46922 Numerical grid generation in computational fluid p 816 A92-47041 dynamics and related fields; Proceedings of the 3rd DOWLER, CONSTANCE A EVERSON, R. M. International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 Eigenfunction analysis of turbulent mixing phenomena Simple effective thickness model for circular brush p 898 A92-45826 [AIAA PAPER 92-3192] [ISBN 0-444-88948-5] p 918 A92-47035 p 903 A92-48803 EVERTON, E. L. EL-BANNA, HESHAM M. DOWNIE, JOHN D. Gridding strategies and associated results for winged Determination of aerodynamic sensitivity coefficients for p 918 A92-47051 Binary optical filters for scale invariant pattern entry vehicles wings in transonic flow recognition Grid generation and compressible flow computations (NASA-CR-1905701 p 832 N92-29657 INASA-TM-103902] p 853 N92-28910 about a high-speed civil transport configuration ELBANNA, HESHAM M. DRABCZUK, R. p 919 A92-47055 Determination of aerodynamic sensitivity coefficients Progress towards the development of transient ram based on the three-dimensional full potential equation accelerator simulation as part of the U.S. Air Force [AIAA PAPER 92-2670] p 798 A92-45525 Armament Directorate Research Program ELDER, M. G. [AIAA PAPER 92-3248] p 904 A92-48847 Analytical and experimental studies of heat pipe radiation DRAGO, R. J. **FALCHETTI, FREDERIC** cooling of hypersonic propulsion systems Advanced CFD simulation and testing of compressor blading in the multistage environment Analytical evaluation of resonant response of spiral bevel p 867 A92-49128 [AIAA PAPER 92-3809] gears in the RAH-66 helicopter Fantail transmission I AIAA PAPER 92-3495] ELESHAKY, MOHAMAD E. p 906 A92-49031 [AIAA PAPER 92-3040] p 822 A92-48701 Aerodynamic design optimization using sensitivity DRUHAN, BARRY B. An explanation-based-learning approach to knowledge analysis and computational fluid dynamics Nonlinear normal and axial force indicial responses for [NASA-CASE-LAR-14815-1-CU] p 910 N92-29830 compilation - A Pilot's Associate application a two dimensional airfoil ELIASSON, PETER p 920 A92-48220 p 830 N92-28888 [AD-A247196] Generation of efficient multiblock grids for Navier-Stokes DUDLEY, MICHAEL R. FARASSAT, F. Large-scale wind tunnel studies of a jet-engined powered computations p 919 A92-47081 High-speed propeller noise prediction ejector-lift STOVL aircraft p 842 A92-45313 ELLIOTT, J. K. multidisciplinary approach p 924 A92-45831 DULIKRAVICH, GEORGE S. Recent CFD applications on iet transport FARGE, TALIB Z. Aerodynamic shape optimization of hypersonic configurations including viscous effects configurations Effect of flow rate on loss mechanisms in a backswept LAIAA PAPER 92-26581 p 844 A92-45519 p 897 A92-45606 centrilugal impeller [AIAA PAPER 92-2635] p 795 A92-45506 ELROD, W. C. FAROKHI, S. **DUMARS. WILLIAM** Wake mixing and performance measurements in a linear A computational study of advanced exhaust system Low VOC primer for structural bonding compressor cascade with crenulated trailing edges transition ducts with experimental validation p 892 A92-47338 p 824 A92-48800 I AIAA PAPER 92-31881 p 907 A92-49126 I AIAA PAPER 92-37941 **DUNCAN, BEVERLY** ELSENAAR, A. FARR, N. Computational analysis of ramjet engine inlet The windtunnel as a tool for laminar flow research Grid generation and compressible flow computations [NLR-TP-90145-U] p 887 N92-28661 about a high-speed civil transport configuration [AIAA PAPER 92-3102] p 824 A92-48744 Instrumentation requirements for laminar flow research p 919 A92-47055 DUNLAVY, S. in the NLR high speed wind tunnel HST Statistical prediction of maximum buffet loads on the FASSI, F. p 887 N92-28669 INLR-TP-89158-U1 AM-X flight simulator from engineering tool to training F/A-18 vertical fin p 811 A92-46816 EMMERSON, A. J. p 884 N92-28536 DUNN, M. G. Aging commuter aeroplanes: Fatigue evaluation and Vane-blade interaction in a transonic turbine. I -FAULKNER, A. control methods p 915 N92-30132 Experience with piloted simulation in the development Aerodynamics p 884 N92-28528 [AIAA PAPER 92-3323] EMO. S. M. p 825 A92-48906 of helicopters Integrated optic components for advanced turbine Vane-blade interaction in a transonic turbine. II - Heat Experience with piloted simulation in the development engine control systems p 925 A92-46248 transfer of helicopters | AIAA PAPER 92-3324 | p 904 A92-48907 ENDOH, M. IMBB-UD-0610-91-PUB1 p 889 N92-30076 DUNN, MARK H. Conceptual study of separated core ultra high bypass FAULSTICH, RAYMOND J. High-speed propeller noise prediction -Common airborne instrumentation system (CAIS) [AIAA PAPER 92-3775] multidisciplinary approach p 924 A92-45831 p 867 A92-49119 p 856 A92-47538

DOEHNEL, W.

FORRESTER, D. A. Upgrading the data processing section of the NAL Gust FAWCETT, P. A. European studies to investigate the feasibility of using Wind Tunnel data processing system Quantification of canard and wing interactions using spatial correlation velocimetry 1000 ft vertical separation minima above FL 290. Part 1: [NAL-TM-635] FUJIWARA, TOSHI p 888 N92-28833 p 807 A92-45588 AIAA PAPER 92-2687 Overview of organisation, techniques employed, and FAY, JOHN F. Numerical simulation of a supersonic let impingement conclusions [NLR-TP-91062-U-PT-1] Laminar hypersonic flow over a compression using the p 841 N92-29605 ISAE PAPER 912014 HANA code p 789 A92-45412 FOSTER, JOHN V. [AIAA PAPER 92-2896] Numerical analysis of RCS jet in hypersonic flights p 820 A92-47872 Application of piloted simulation to high-angle-of-attack p 791 A92-45445 [SAE PAPER 912063] FECKE, THEODORE flight-dynamics research for fighter aircraft Aero mechanics in the twenty-first century | AIAA PAPER 92-3194| p 863 p 886 N92-28551 **FUKUDA, MASAHIRO** Finite elements analysis of flexural edge wave for p 863 A92-48805 FOULADI, KAMRAN composite fan blades [SAE PAPER 912048] FEGGETTER, AMANDA J. W. Viscous flow past a nacelle isolated and in proximity p 861 A92-45432 The development of an intelligent human factors data of a flat plate FULCHER, KAREN base as an aid for the investigation of aircraft accidents [AIAA PAPER 92-2723] p 803 A92-45560 p 928 A92-44994 On the aerodynamics/dynamics of store separation from FOYE, R. L. hypersonic aircraft The effect of composite material allowable changes on [AIAA PAPER 92-2722] p 807 A92-45595 Navier-Stokes computation of wing leading edge VTOL airframe weights p 848 A92-47629 tangential blowing for a tilt rotor in hover
[AIAA PAPER 92-2608] p.8 FULLER, ANDREW FRADENBURGH, EVAN A. p 805 A92-45568 Rapid systems integration of navigation avionics The high speed challenge for rotary wing aircraft p 858 A92-48473 p 842 A92-45381 [SAE PAPER 911974] FULTON, KEN Prediction of gas turbine combustor flow by a finite FRANCOIS, G. CIS engines. I - The range revealed element code New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels p 786 A92-47821 [AIAA PAPER 92-3469] FUNK, R. B. FENDELL, F. E. p 882 A92-48600 [ONERA, TP NO. 1992-39] Quantification of canard and wing interactions using Laser-initiated conical detonation wave for supersonic FRANKEL, S. H. spatial correlation velocimetry combustion. III Modeling of the reactant conversion rate in a turbulent [AIAA PAPER 92-2687] p 807 A92-45588 [AIAA PAPER 92-3247] p 893 A92-48846 p 829 N92-28820 FERLITA, FRANK FRANKLIN, JAMES A. G Rotor support for the STME oxygen turbopump [AIAA PAPER 92-3282] p 904 A92 Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 p 904 A92-48872 FERRANTI, MICHAEL J. GAI, S. L. FREDETTE, R. E. Full mission simulation: A view into the future Separated high enthalpy dissociated laminar hypersonic A USAF assessment of STOVL fighter options p 884 N92-28537 flow behind a step - Pressure measurements p 842 A92-45310 p 809 A92-45858 FERZIGER, J. H. FREDRIKSSON, BILLY GAILLARDON, J. M. Effect of walls on the supersonic reacting mixing layer A manufacturer's approach to ensure long term Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123 p 838 N92-30133 structural integrity FISCHER, TERENCE FREEMAN, LEONARD S. Simulation of triple simultaneous parallel ILS pproaches p 880 A92-45025 GAINER, CHARLES An overview of US Navy and Marine Corps V/STOL The use of a dedicated testbed to evaluate simulator p 783 A92-45303 approaches FISHER, EDWARD A FRENCH, J. R. training effectiveness p 884 N92-28533 GAL-OR BENJAMIN 7 Experimental pyrometer system for a gas turbine Crew transportation for the 1990s. I - Commercializing Maximizing thrust-vectoring control power and agility manned flight with today's propulsion [AIAA PAPER 92-3482] p 874 A92-46794 p 859 A92-49022 p 889 A92-46726 metrics FREYMUTH, PETER GALLOWAY, GORDON L. FISHER, M. S. Visualization of stopping flow over airfoils
[AIAA PAPER 92-2730] p 804 Modular simulation of HEI fragments and blast Computational icing analysis for aircraft inlets p 836 A92-48793 p 804 A92-45564 pressure [AIAA PAPER 92-3178] FRIEDMANN, P. P. AD-A2482051 p 910 N92-29191 FITSCHEN, KEITH Integrated aeroservoelastic wing synthesis by nonlinear GAMBILL, J. M. Autonomous landing - Functional requirements programming/approximation concepts Computational icing analysis for aircraft inlets [AIAA PAPER 92-3178] p 836 AS p 840 A92-48470 p 873 A92-46752 p 836 A92-48793 FITZGERALD, TIMOTHY R. FRIES, SYLVIA DOUGHTY GANY, ALON Use of high-fidelity simulation in the development of an NASA engineers and the age of Apollo Fuel regression mechanism in a solid fuel ramjet F/A-18 active ground collision avoidance system p 929 N92-28344 [NASA-SP-4104] p 837 N92-28530 p 860 A92-44898 FROOM, DOUGLAS A. GAONKAR, G. H. Nondestructive inspection perspectives Computational aspects of helicopter trim analysis and damping levels from Floquet theory p 875 A92-46933 On the measurement of subsonic flow around an p 915 N92-30121 appended body of revolution at cryogenic conditions in FU. AN-KUO On the adequacy of modeling turbulence and related p 880 A92-45265 An experimental investigation of the effect of p 847 A92-46945 FLEETER, SANFORD effects on helicopter response leading-edge extensions on directional stability and the Airfoil wake and linear theory gust response including GAPONOV. S. A. effectiveness of forebody nose strakes Effect of a fan of rarefaction waves on the development sub and superresonant flow conditions p 802 A92-45554 [AIAA PAPER 92-2715] [AIAA PAPER 92-3074] p 823 A92-48724 of disturbances in a supersonic boundary layer FUGLSANG, D. F. p 809 A92-46519 FLITCROFT, J. E. Design load predictions on a fighter-like aircraft wing Prediction and measurement of jet flowfield features for p 811 A92-46797 GARDINER, PETER T. p 787 A92-45318 Fibre optic rotary position sensors for vehicle and propulsion controls p 855 A92-46243 ASTOVL aircraft FUGLSANG, DENNIS F. FLOM. YURY A numerical study of control surface buzz using computational fluid dynamic methods Superconducting bearings with levitation control GARLAND, DOUG AIAA PAPER 92-2654] p 806 A92-45578 Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft configurations [NASA-CASE-GSC-13346-1] p 909 N92-29099 FUJIEDA, HIBOTOSHI FLOOD, JOSEPH D. Experimental studies on aerodynamic characteristics of [AIAA PAPER 92-3094] p 824 A92-48738 SSTO vehicle at low subsonic speeds [SAE PAPER 911981] GARRARD, WILLIAM L. Hot gas ingestion characteristics and flow visualization p 788 A92-45386 of a vectored thrust STOVL concept Feedback control laws for highly maneuverable Wind tunnel investigation of an improved upper surface p 860 A92-45316 aircraft blown flap transport semi-span model [SAE PAPER 911993] [NASA-CR-190535] p 879 N92-29654 FLOUTI, REALY p 789 A92-45395 Mathematical modeling of the flight of passenger aircraft GARRARD, WILLIAM L., JR. Aerodynamic development of boundary layer control in the case of engine failure p 875 A92-47777 Nonlinear inversion control system for NAL QSTOL research aircraft 'ASKA' p 873 A92-46751 FLOWERS, GEORGE T. supermaneuverable aircraft (SAE PAPER 912010) p 843 A92-45410 GARY, BRUCE L. Chaotic dynamic behavior in a simplified rotor blade lag Upgrading the data processing section of the NAL Gust Microwave temperature profiler for clear air turbulence model p 846 A92-46926 Wind Tunnel data processing system FLOYD, ROBERT L., JR. p 888 N92-28833 [NAL-TM-635] NASA-CASE-NPO-18115-1-CU Anodize and prime your aluminum without environmental p 916 N92-29148 FÚJII, KOZO GASTINEAU, ZANE p 892 A92-47340 headaches Recent applications of the FNS zonal Method to complex Intelligent Engine Control (IEC)
AIAA PAPER 92-3484 FORD, BRIAN flow problems p 866 A92-49024 The application of multimedia expert systems to the [SAE PAPER 912003] p 789 A92-45404 GATES, THOMAS S. depot level maintenance environment Numerical simulations of hypersonic real-gas flows over p 922 A92-48557 Apparatus for elevated temperature compression or tension testing of specimens snace vehicles FORMAGGIA, LUCA [SAE PAPER 912045] p 791 A92-45429 [NASA-CASE-LAR-14775-1] p 912 N92-30099 An unstructured mesh generation algorithm for three-dimensional aeronautical configurations FÚJITA, TOSHIMI GEARHART, LARRY Experimental studies on aerodynamic characteristics of

SSTO vehicle at low subsonic speeds

blown flap transport semi-span model

Wind tunnel investigation of an improved upper surface

p 788 A92-45386

p 789 A92-45395

in Ada

GEE KEN

[AIAA PAPER 92-2673]

[SAE PAPER 911981]

| SAE PAPER 911993 |

p 918 A92-47053

p 845 A92-45573

Application of the Euler method EUFLEX to a fighter-type

airplane configuration at transonic speed

FORNASIER, L.

| AIAA PAPER 92-2620 |

p 858 A92-48475

p 798 A92-45528

Design and implementation of a generic Kalman filter

Numerical investigation of tail buffet on F-18 aircraft

Initial validation of a R/D simulator with large amplitude

Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435

motion

HALL, LAURA E.

[NASA-TM-107586]

p 886 N92-28546

GUENETTE, G. R.

Analysis of a pneumatic forebody flow control concept

about a full aircraft geometry	Generators inside small engines	Dynamic control of aerodynamic instabilities in gas
[AIAA PAPER 92-2678] p 799 A92-45530	[AIAA PAPER 92-3755] p 867 A92-49113 GOLDEN, K.	turbine engines p 870 N92-28466 GUERNIGOU, J.
GENNARETTI, M. A new integral equation for potential compressible	Hypersonic plasma predictions at nonzero angle of	Indirect measurements of convective flow by IR
aerodynamics of rotors in forward flight	attack	thermography
p 815 A92-46958	[AIAA PAPER 92-3027] p 925 A92-47028	[ONERA, TP NO. 1992-46] p 902 A92-48607
GEORGALA, J. M.	GOLDMAN, LOUIS J.	GUERNSEY, D.
The construction, application and interpretation of	Laser anemometer measurements and computations in	On the choice of appropriate bases for nonlinear
three-dimensional hybrid meshes p 919 A92-47089	an annular cascade of high turning core turbine vanes [NASA-TP-3252] p 830 N92-28980	dynamic modal analysis p 847 A92-46927
GEORGE, A. Laser velocimetry measurements in an MHD	GOLDSTEIN, HOWARD E.	GUGLIERI, G.
Laser velocimetry measurements in an MHD aerodynamic duct	Performance of uncoated AFRSI blankets during	Experimental investigation of vortex dynamics on delta
[AIAA PAPER 92-2986] p 899 A92-46996	multiple Space Shuttle flights	wings
GEORGE, V. V.	[NASA-TM-103892] p 890 N92-29104	[AIAA PAPER 92-2731] p 804 A92-45565
On the adequacy of modeling turbulence and related	GOODEN, J. H. M.	GUICHETEAU, PH. Use of a research simulator for the development of new
effects on helicopter response p 847 A92-46945	Comparison of LDA and LTA applications for propeller	concepts of flight control p 885 N92-28543
GHAOUI, LAURENT E.	tests in wind tunnels	GULATI, ANIL
Linear quadratic minimax controllers	[NLR-MP-88031-U] p 827 N92-28658	Measurement of scalar flowfield at exit of combustor
p 917 A92-46748	Flow gradient corrections on hot-wire measurements using an X-wire probe	sector using Raman diagnostics
GHASSEMI, M. Three-dimensional-mode resonance in far wakes	[NLR-TP-90255-U] p 829 N92-28713	[AIAA PAPER 92-3350] p 894 A92-48927
p 898 A92-46252	GOODSON, JOHN H.	GULCAT, U.
GHAYEM, SHAHROKH	Gulf Range Drone Control Upgrade System Mobile	3-D numerical grid generation for the transonic flow
F-16 failure detection isolation and estimation study	Control System p 882 A92-47567	analysis about multi-bodies p 817 A92-47061
p 876 A92-48490	GORANSON, ULF G.	GUNN, W. H.
GHAZI, M. A.	Structural integrity of future aging airplanes	Airline deregulation - Impact on human factors
Aircraft spoiler effects under wind shear	p 913 N92-30107	p 834 A92-44999
[AIAA PAPER 92-2642] p 796 A92-45509	GORDON, IRA The application of multimedia expert systems to the	GUO, R. W.
GHIRINGHELLI, GIAN L. Linear analysis of naturally curved and twisted	depot level maintenance environment	New method of swirl control in a diffusing S-duct p 809 A92-45859
anisotropic beam p 899 A92-46936	p 922 A92-48557	GUO, WEN-HAI
GIANNAKIDIS, GEORGE	GORELOV, V. A.	An improved multiple line-vortex method for simulation
Calculation of potential flow around airfoils using a	The flow pattern and external heat transfer investigation	of separated vortices of slender wings
discrete vortex method p 808 A92-45827	for gas turbine vanes end surfaces	p 819 A92-47694
GIBB, GERALD D.	[AIAA PAPER 92-3071] p 903 A92-48722	GUPTA, ROOP N.
Full model simulation of the National Airspace System	GOTO, NORIHIRO	Enhancements to viscous-shock-layer technique
- Research and training platform p 880 A92-45042	Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454	[AIAA PAPER 92-2897] p 820 A92-47873
GILLINGHAM, KENT K. An aircraft landing accident caused by visually induced	GRAFFSTEIN, JERZY	GURLEY, SYDNEY E.
spatial disorientation p 834 A92-44993	Selected models of aircraft navigation space	Civil development and certification of a helicopter
GILYARD, GLENN B.	p 839 A92-45373	automatic approach and hover system on the Sikorsky S-76
Subsonic flight test evaluation of a performance seeking	GRAFTON, M.	[SAE PAPER 911975] p 872 A92-45382
control algorithm on an F-15 airplane	Compensating for manufacturing and life-cycle	GURUSWAMY, GURU P.
[AIAA PAPER 92-3743] p 878 A92-49109	variations in aircraft engine control systems	Numerical investigation of tail buffet on F-18 aircraft
		Numerical investigation of tall buriet on 7-16 alterast
Subsonic flight test evaluation of a propulsion system	[AIAA PAPER 92-3869] p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings,
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A.	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J.
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P.	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p. 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p. 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p. 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITNER, NATHAN M.	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p. 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p. 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p. 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, RSF-7/3617-AY-022A] p. 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p. 792 A92-45480	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAM M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P.	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAM M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P.	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-2954	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAYELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid tuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J.
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, TP NO. 1992-1] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid tuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, TP NO. 1992-1] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [INSA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [IAIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid tuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed aerodynamics	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA, RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed aerodynamics p 787 A92-4563 GREIF, R.	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed aerodynamics p 787 A92-45263 GREIF, R. Current DOT research on the effect of multiple site	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J.
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-4881 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed aerodynamics p 787 A92-45263 GREIF, R. Current DOT research on the effect of multiple site damage on structural integrity p 913 N92-30112 GREITZER, E. M. Inlet distortion effects in aircraft propulsion system	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 9821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfolis vibration [ONERA, RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-169171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028	AlAA PAPER 92-3869 p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective p 914 N92-30117
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-4881 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack	[AIAA PAPER 92-3869] p 868 A92-49139 GRAHAM, G. M. Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888 GRAHAM, W. R. Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201 GRALLERT, H. Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 GRASSO, F. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 GRAVELLE, ALAIN Advances in aircraft modal identification [ONERA, TP NO. 1992-47] p 877 A92-48608 GRAY, DAVID L. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 GREENDYKE, ROBERT B. A parametric analysis of radiative structure in aerobrake shock layers [AIAA PAPER 92-2970] p 816 A92-46985 GREENE, G. C. High-Reynolds-number test requirements in low-speed aerodynamics p 787 A92-30112 GREIF, R. Current DOT research on the effect of multiple site damage on structural integrity p 913 N92-30112 GREITZER, E. M. Inlet distortion effects in aircraft propulsion system integration p 869 N92-28464 Dynamic control of aerodynamic instabilities in gas	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective HAILYE, MICHAEL
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028	AlAA PAPER 92-3869 p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective p 914 N92-30117
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028 GLEASON, DANIEL Use of simulation in the USAF Test Pilot School curriculum p 884 N92-28535	Alaa Paper 92-3869 p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airadta calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective [AIAA PAPER 92-2724] p 803 A92-45561 HALE, A. A.
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-46577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028 GLASON, DANIEL Use of simulation in the USAF Test Pilot School curriculum p 884 N92-28535 GLOMB, WALTER L., JR. Fiber-optic position transducers for aircraft controls	Alaa Paper 92-3869 p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 982 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective p 914 N92-30117 HAILYE, MICHAEL The flip flop nozzle extended to supersonic flows [AIAA PAPER 92-2724] p 803 A92-45561 HALE, A. A. DYNamic Turbine Engine Compressor Code
Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine [AIAA PAPER 92-3745] p 866 A92-49110 GIRAGOSIAN, PAKRAD A. Rapid synthesis for evaluating missile maneuverability parameters [AIAA PAPER 92-2615] p 873 A92-45488 GIRODROUX-LAVIGNE, P. Calculation of fully three-dimensional separated flows with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48577 Development of an unsteady three-dimensional viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206 GITTNER, NATHAN M. The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 GIVI, P. Modeling of the reactant conversion rate in a turbulent shear flow p 829 N92-28820 GIZDOVA, N. D. Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 GLASS, ROBERT An artificial intelligence approach for the verification of requirements for aircraft electrical power systems p 863 A92-48481 GLASSMAN, ARTHUR J. Users manual for updated computer code for axial-flow compressor conceptual design [NASA-CR-189171] p 924 N92-30207 GLATT, L. Hypersonic plasma predictions at nonzero angle of attack [AIAA PAPER 92-3027] p 925 A92-47028 GLEASON, DANIEL Use of simulation in the USAF Test Pilot School curriculum p 884 N92-28535	Alaa Paper 92-3869 p 868 A92-49139	[AIAA PAPER 92-2673] p 798 A92-45528 Navier-Stokes computations on swept-tapered wings, including flexibility p 810 A92-46786 GUTIERREZ, PIERRE J. High-temperature miniaturized turbine engine lubrication system simulator [AD-A249259] p 868 N92-28294 GYSLING, D. L. A theoretical study of sensor-actuator schemes for rotating stall control [AIAA PAPER 92-3486] p 878 A92-49025 Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 H HAAS, J. F. The DAM vertical shock-tube p 880 A92-45096 HADAR, ILAN Fuel regression mechanism in a solid fuel ramjet p 860 A92-44898 HAERING, EDWARD A., JR. Airadta calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 HAEUSER, J. Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd International Conference, Universidad Politecnica de Cataluna, Barcelona, Spain, June 3-7, 1991 [ISBN 0-444-88948-5] p 918 A92-47035 Aerothermodynamic calculations for the Space Shuttle Orbiter [AIAA PAPER 92-2953] p 821 A92-47917 HAGEMAIER, DONALD J. Inspection of aging aircraft: A manufacturer's perspective [AIAA PAPER 92-2724] p 803 A92-45561 HALE, A. A.

and management system for remote sensing flights p 840 A92-47630

Solutions of acoustic field problems using parallel

Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695

p 925 A92-45929

GROSCH, C. E.

computers

GU, WEN-YING

GOLDBERG, NORMAN

effects on a transport aircraft configuration
[AIAA PAPER 92-3097] p. 849

GOETZENDORF-GRABOWSKI, TOMASZ

Investigations of propulsion integration interference

Calculation of the aerodynamic derivatives of aircraft in the supersonic region using the Mach box method p 875 A92-47779

p 849 A92-48739

p 870 N92-28466

p 858 A92-48477

p 905 A92-48939

p 849 A92-48408

p 888 N92-29352

p 852 N92-28687

p 888 N92-29352

p 928 A92-49117

p 788 A92-45390

p 880 A92-45026

p 862 A92-46429

p 883 N92-28523

p 923 N92-29188

of wing/body

p 795 A92-45505

p 791 A92-45443

p 881 A92-45323

p 854 N92-29417

p 853 N92-28926

p 853 N92-28910

p 806 A92-45574

PERSONAL AUTHOR INDEX HAUGER, MICHAEL HALLIWELL, I. Dynamic control of aerodynamic instabilities in case Investigation of three-dimensional flow field in a turbine German-GUS cooperation in civil aviation turbine engines including rotor/stator interaction. I - Design development p 785 A92-47592 HENLEY, A. J. and performance of the research facility An integrated navigation system manager using HAUSER, JOHN p 883 A92-48908 federated Kalman filtering AIAA PAPER 92-33251 Nonlinear control design for slightly nonminimum phase HALT, D. W. systems - Application to V/STOL aircraft HENRY, Z. S. A compact higher order Euler solver for unstructured Advanced Rotorcraft Transmission (ART) - Component p 876 A92-48160 grids with curved boundaries test results HAWKINS, J. M. [AIAA PAPER 92-3366] p 807 A92-45590 I AIAA PAPER 92-26961 High speed rotorcraft propulsion concepts to control Compact higher order characteristic-based Euler solver HERDEG, WOLFGANG F. power/speed characteristics p 812 A92-46889 Bistatic scattering on a monostatic radar range for unstructured grids AIAA PAPER 92-33671 p 865 A92-48940 HALUCK, DAVID HAYAMA, KENJI Rotor support for the STME oxygen turbopump Experimental and numerical study of aerodynamic HERGERT, DENNIS W. p 904 A92-48872 AIAA PAPER 92-32821 Buffet test in the National Transonic Facility characteristics for second generation SST I NASA-CR-189595 | p 844 A92-45439 HAM. JOHNNIE A. |SAE PAPER 912056| Frequency domain flight testing and analysis of an HERMANS, C. HAYASHI, A. K. p 847 A92-46943 OH-58D helicopter Numerical simulation of a supersonic jet impingement LAH-main rotor model test at the DNW on a ground |SAE PAPER 912014| INLR-TP-90305-U HAM, NANCY M. Tooling for C-17 composite parts p 900 A92-47412 HERRING, FRED M. p 789 A92-45412 HAMED, A Numerical analysis of RCS jet in hypersonic flights Buffet test in the National Transonic Facility A study on the impact of shroud geometry on ejector [SAE PAPER 912063] p 791 A92-45445 [NASA-CR-189595] pumping performance HAYASHI, MASANORI HESS, PAUL J. p 864 A92-48856 [AIAA PAPER 92-3260] Numerical simulations of separated flows around Engine aircraft systems integration course HAMILTON-JONES, LYNNE T. oscillating airfoil for dynamic stall phenomena [SAE PAPER 911991] p 788 [AIAA PAPER 92-3762] Analysis of the VISTA longitudinal simulation capability p 788 A92-45393 HESSENIUS, KRISTIN A. p 876 A92-48488 for a cruise flight condition Aerodynamic heating in three-dimensional shock wave Computational aerodynamics - The next generation [SAE PAPER 911988] p 788 A92-45390 HAMILTON, B. K. turbulent boundary layer interaction induced by sweptback A general purpose nonlinear rigid body mass finite sharp fins in hypersonic flows HETTINGER, LAWRENCE J. [SAE PAPER 912044] element for application to rotary wing dynamics p 791 A92-45428 Toward an integrated multimodal approach to flight p 846 A92-46924 Numerical experiments on unsteady shock reflection processes using the thin-tayer Navier-Stokes equations simulation HAMMOND, D. L. HEWITT, F. A. A USAF assessment of STOVL fighter options p 818 A92-47155 p 842 A92-45310 Propulsion system performance and integration for high HAYASHI, YOICHI Mach air breathing flight HANFF, E. S. Structural concept of main wings of high altitude Prediction of leading-edge vortex breakdown on a delta unmanned aerial vehicle and basic properties of Opportunities for flight simulation to improve operational wing oscillating in roll thermoplastic composites as candidate material p 807 A92-45585 (SAE PAPER 912053) [AIĂA PAPER 92-2677] p 843 A92-45437 effectiveness HICKEY, ALBERT E. HANKE, D. HAYES, MICHAEL S. The role of systems simulation for the development and Design specifications for the Advanced Instructional Who or what saved the day? A comparison of traditional ualification of ATTAS p 886 N92-28548 Design Advisor (AIDA), volume 2 nd glass cockpits p 833 A92-44931 HANRAHAN, T. HAYNES, J. [AD-A248202] Hypersonic plasma predictions at nonzero angle of Dynamic control of aerodynamic instabilities in gas HICKS, R. M. p 870 N92-28466 ırbine engines Practical optimization design [AIAA PAPER 92-3027] p 925 A92-47028 HE, CHENG J. configurations using the Euler equations HANSEN, IRVING G. An aeroelastic analysis with a generalized dynamic [AIAA PAPER 92-26331 Electromechanical systems with transient high power p 847 A92-46932 HIGASHINO, FUMIO response operating from a resonant AC link HE, HONGQING Oscillation of oblique shock waves generated in a two p 870 N92-28985 [NASA-TM-105716] Ablative control mechanism in nozzle dimensional asymmetric nozzle ermo-protection HÀNSEN, JAMES C. [SAE PAPER 912061] A high performance general purpose processing element [AIAA PAPER 92-3054] p 889 A92-48712 HILL C. J. for avionic applications p 920 A92-48440 HE. LI X. Ground surface erosion - British Aerospace test facility HANSMAN, R. J., JR. Location and tracking technique in a multistatic system and experimental studies Electronic presentation of instrument approach established by multiple bistatic systems HILL, GARY C. p 855 A92-44923 p 840 A92-48480 Improving designer productivity [NASA-TM-103929] HARASGAMA, S. P. The application of particle image velocimetry (PIV) in a Establishing a database for flight in the wakes of HINDSON, WILLIAM S. short-duration transonic annular turbine cascade structures p 810 A92-46782 Rotorcraft In-Flight Simulation Research at NASA Ames p 899 A92-46825 ASME PAPER 91-GT-2211 Flight deck aerodynamics of a nonaviation ship Research Center: A Review of the 1980's and plans for HARLOFF, GARY J. p 810 A92-46790 the 1990's Navier-Stokes analysis and experimental HEATH, G. comparison of compressible flow in a diffusing S-duct [AIAA PAPER 92-2699] p 800 A92-45541 [NASA-TM-103873] Application of face-gear drives in helicopter HINE, BUTLER P. transmissions HARLOWE, W. W. [NASA-TM-105655] Binary optical filters for scale invariant pattern p 908 N92-28434 Ignition delays, heats of combustion, and reaction rates HEATH, GREGORY F. recognition [NASA-TM-103902] of aluminum alkyl derivatives used as ignition and Advanced Rotorcraft Transmission program summary combustion enhancers for supersonic combustors [AIAA PAPER 92-3363] p 905 A92-48936 p 894 A92-49134 I AIAA PAPER 92-3841 I HEBBAR, SHESHAGIRI K. Surface and flow field measurements in a symmetric crossing shock wave/turbulent boundary layer flow HÀRRIS. CHARLES E. Pitch rate/sideslip effects on leading-edge extension The 1991 International Conference on Aging Aircraft and [AIAA PAPER 92-2634] vortices of an F/A-18 aircraft model Structural Airworthiness p 874 A92-46810 HINKEY, J. B. [NASA-CP-3160] p 912 N92-30106 HECHT, F. High spatial resolution measurements of ram accelerator Fracture mechanics research at NASA related to the Anisotropic control of mesh generation based upon a gas dynamic phenomena aging commercial transport fleet p 913 N92-30110 [AIAA PAPER 92-3244] Voronoi type method HARRÍS, JULIUS E. HEFFNER, K. S. HIRSCHEL, E. H. A new approach for the calculation of transitional Numerical and experimental investigation of rarefied ompression corner flow [AIAA PAPER 92-2669] p 798 A92-45524 [AIAA PAPER 92-2900] p 820 A92-47876 [MBB-FE-202-S-PUB-0463-A] HASEGAWA, GIZO HEIMBERG, F. Free wake analyses of a hovering rotor using panel Construction of a real-time DGPS experimental system method p 840 A92-47631 aerothermodynamics p 789 A92-45405 [SAE PAPER 912004] HEISS, S. [MBB-FE-202-S-PUB-0464-A] Prediction of dynamic hub load of a rotor executing Application of the Euler method EUFLEX to a fighter-type

p 903 A92-48844 Saenger: The reference concept and its technological requirements - aerothermodynamics p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental p 831 N92-29648 Aerothermodynamics and propulsion integration in the multiple sinusoidal blade pitch variations airplane configuration at transonic speed Saenger technology programme p 846 A92-46921 [AIAA PAPER 92-2620] p 845 A92-45573 IMB8-FE-202-S-PUB-0469-A1 p 831 N92-29649 HASSAN, AHMED A. HÉMSCH, MICHAEL J. Effects of leading and trailing edge flaps on the Aerothermodynamic challenges of the Saenger Alleviation of side force on tangent-ogive forebodies space-transportation system aerodynamics of airfoil/vortex interactions using passive porosity | MBB-FE-202-S-PUB-0462-A | p 890 N92-29680 p 815 A92-46957 AIAA PAPER 92-2711] p 802 A92-45552 Hypersonic flow past radiation-cooled surfaces HASSAN, H. A. HENDERSON, GREGORY H. p 832 N92-29713 MBB-FE-202-S-PUB-0468-A1 A new approach for the calculation of transitional Airfoil wake and linear theory gust response including Acquisition of an aerothermodynamic data base by ub and superresonant flow conditions [AIAA PAPER 92-2669] p 798 A92-45524 p 823 A92-48724 [AIAA PAPER 92-3074] means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 N92-30232 HÉNDRICKS, G. J. HATTESTAD, BJARNE Mandatory psychological testing of pilots as a A theoretical study of sensor-actuator schemes for HOADLEY, SHERWOOD T. requirement for licensing in Norway? rotating stall control On-line performance evaluation of multiloop digital p 835 A92-45081 1 AIAA PAPER 92-34861 p 873 A92-46739 p 878 A92-49025 control systems

HOPWOOD, S. T. HUANG, ZHI-TAO HOBSON, G. V. turbulence model based on RNG for The application of particle image velocimetry (PIV) in a A new method for predicting the end wall boundary layers quasi-three-dimensional cascade flows short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A9 and the blade force defects inside the passage of axial p 825 A92-48898 p 899 A92-46825 1AIAA PAPER 92-33121 compressor cascades p 819 A92-47691 HORNUNG, HANS G. HOBSON, GARTH V. HUDGENS, JULIE A. Analysis of thermo-chemical nonequilibrium models for A Navier-Stokes analysis of a controlled-diffusion Operating characteristics at Mach 4 of an inlet having compressor cascade at increasing inlet-flow angles carbon dioxide flows forward-swept, sidewall-compression surfaces p 825 A92-48899 [AIAA PAPER 92-2852] p 892 A92-47835 p 863 A92-48743 I AIAA PAPER 92-3313 I [AIAA PAPER 92-3101] HOROWITZ, I. M. HUETTIG. GERHARD HODGKINSON, J. Robust discrete controller design for an unmanned Centre for Flight Simulation Berlin Airbus 340 simulator for research and training p 880 A92-45028 The use and effectiveness of piloted simulation in research vehicle (URV) using discrete quantitative transport aircraft research and development p 880 A92-45028 p 877 A92-48495 feedback theory p 886 N92-28549 HUGGINS, RAYMOND W. HORSTMAN, C. C. HOEG, J. G. Multi-analog track fiber coupled position sensor Interaction between crossing oblique shocks and a p 857 A92-48043 Aircraft ship operations turbulent boundary laver p 812 A92-46882 [AGARD-AR-312] p 850 N92-28468 HUNT, GRAHAM J. F. HOEIJMAKERS, H. W. M. Getting test items to measure knowledge at the level Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92of complexity which licensing authorities desire - Anothe Numerical investigation into high-angle-of-attack p 889 A92-45442 leading-edge vortex flow [AIAA PAPER 92-2600] p 835 A92-45080 dimension to test validity HOU, GENE W. p 791 A92-45477 HUNTSMAN, STEVEN D. Taylor series approximation of geometric shape variation Filament winding of composite isogrid fuselage Analysis of results of an Euler-equation method applied for the Euler equations p 899 A92-46916 p 784 A92-47405 to leading-edge vortex flow [NLR-TP-90368-U] HOU, LIN-JUN p 827 N92-28657 HUTCHINSON, JOHN W. Periodic trim solutions with hp-version finite elements A method for computing the 3-dimensional flow about Preliminary results on the fracture analysis of multi-site p 874 A92-46931 wings with leading-edge vortex separation. Part 2: cracking of lap joints in aircraft skins HOUNJET, M. H. L. Description of computer program VORSEP p 913 N92-30111 p 833 N92-29916 Hyperbolic grid generation with BEM source terms [NLR-TR-86006-U] HUYNH, H. T. INLR-TP-90334-U1 p 923 N92-28635 HOFF, FREDERICK G. Some longitudinal handling qualities design guidelines Calculation of unsteady subsonic and supersonic flow Wavelength encoded fiber optic angular displacement for active control technology transport aircraft about oscillating wings and bodies by new panel p 857 A92-48046 [NLR-TP-90129-U] p 878 N92-28652 sensor HOFFLER, KEITH D. HUYNH, LOC C. p 827 N92-28659 INLR-TP-89119-U1 Application of piloted simulation to high-angle-of-attack Analysis of a hydrocarbon scramjet with augmented Hyperbolic grid generation control by panel methods flight-dynamics research for fighter aircraft preburning [NLR-TP-91061-U] p 924 N92-29604 p 886 N92-28551 [AIAA PAPER 92-3425] p 865 A92-48984 HOUPIS, C. H. HOFFMAN, MARK HYLL, LESLIE Robust discrete controller design for an unmanned The importance of implicit and explicit knowledge in a Design and implementation of a generic Kalman filter research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495 p 858 A92-48567 p 858 A92-48475 pilot's associate system in Ada HOFFMAN, MARK A. HOUTMAN, E. M. An explanation-based-learning approach to knowledge 1 Comparison of interferometric measurements with 3-D compilation - A Pilot's Associate application Euler computations for circular cones in supersonic flow p 920 A92-48220 [AIAA PAPER 92-2691] p 800 A92-45538 IDAN, M. HOFFMANN, KLAUS A. HOWARD, S. Parameter identification of linear systems based on Grid sensitivity in low Reynolds number hypersonic smoothing IDZOREK, JULIAN J. Hypersonic plasma predictions at nonzero angle of p 873 A92-46742 p 817 A92-47057 continuum flows attack Effect of the grid system on heat transfer computations [AIAA PAPER 92-3027] Experience in the operation of a hypersonic nozzle static p 925 A92-47028 p 900 A92-47071 for high speed flows thrust stand HOWLETT, CARL L. HOGGARD, AMOS W. [AIAA PAPER 92-3292] p 882 A92-48881 Examination of ultraviolet radiation theory for bow shock Maintaining the safety of an aging fleet of aircraft rocket experiments p 837 N92-30108 Combustion of solid fueled ramjet. II [AIAA PAPER 92-2871] p 901 A92-47853 HOH, ROGER H. [AIAA PAPER 92-3728] p 894 A92-49106 HOWLETT, JAMES T. The use of ground based simulation for handling qualities IIZUKA, HIROYUKI Calculation of unsteady transonic flows with mild p 885 N92-28545 research: A new assessment Experimental and numerical studies of radiation emission separation by viscous-inviscid interaction HOHEISEL, H. from high-temperature air behind 10 km/s shock waves [NASA-TP-3197] p 827 N92-28477 Investigations of propulsion integration interference [SAE PAPER 912025] p 790 A92-45417 HSIA, Y.-C. ILÍNCA, A. effects on a transport aircraft configuration FNS analysis of an axisymmetric scramjet inlet [AIAA PAPER 92-3097] Prediction of laminar boundary layer using cubic p 824 A92-48742 [AIAA PAPER 92-3100] HOKE, MICHAEL J. solines HSIEH, T. [AIAA PAPER 92-2702] A field repair of advanced helicopter vertical fin p 801 A92-45544 Comparison of two flux splitting schemes for calculation IMANARI, KUNIYUKI p 785 A92-47417 structure of ogive-cylinder at M = 3.5 and alpha = 18 deg Application of non-reflecting boundary conditions to of ogve-cylinder at M = 3.3 and appra = 1.5 day (AIAA PAPER 92-2667) p 806 A92-45582 Separation patterns and flow structures about a hemisphere-cylinder at high incidences HOLDEMAN, J. D. Experimental study of cross-stream mixing in a three-dimensional Euler equation calculations for thick rectangular duct [AIAA PAPER 92-3090] [AIAA PAPER 92-3045] p 822 A92-48705 p 903 A92-48735 p 807 A92-45593 [AIAA PAPER 92-2712] IMBERT, CLEMENT HOLLAND, SCOTT D. HSU, MING-HWANG Magnetic particle testing of turbine blades mounted on Internal shock interactions in propulsion/airframe Development of the DDV actuation system on the IDF the turbine rotor shaft p 898 A92-46498 integrated three-dimensional sidewall compression IMLAY, SCOTT T. aircraft scramiet inlets Solution of the Burnett equations for hypersonic flows [SAE PAPER 912080] p 844 A92-45455 [AIAA PAPER 92-3099] HSU, YEN-NIEN near the continuum limit HOLLE, GLENN F. [AIAA PAPER 92-2922] Development of the DDV actuation system on the IDF p 821 A92-47894 Simple effective thickness model for circular brush Numerical simulations of the transdetonative ram aircraft seals accelerator combusting flow field on a parallel computer [AIAA PAPER 92-3249] p 894 A92-48848 [SAE PAPER 912080] p 844 A92-45455 [AIAA PAPER 92-3192] p 903 A92-48803 HU. C. C. HOLLO, S. D. INAGAKI, TOSHIHARU Identification of aerodynamic models for maneuvering KrF laser-induced OH fluorescence imaging in a In-flight simulation of backside operating models using aircraft supersonic combustion tunnel direct lift controller p 852 N92-28720 [NASA-CR-190444] [AIAA PAPER 92-3346] [SAE PAPER 912069] p 872 A92-45450 HUA, KAI HOLM, INGVAR ING. D. N. Study on two variable control plan for twin spool turbojet A manufacturer's approach to ensure long term The experimental and computational study of jet p 862 A92-47697 engine p 838 N92-30133 structural integrity impingement flowfields with reference to VSTOL aircraft HUANG, PAO S. HONMA, HIROKI p 787 A92-45324 performance Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced Navier-Stokes code INOUE, YUMIKO Experimental and numerical studies of radiation emission Numerical analysis of RCS jet in hypersonic flights [SAE PAPER 912063] p 791 A92-45445 from high-temperature air behind 10 km/s shock waves (SAE PAPER 912025) p 790 A92-45417 [AIAA PAPER 92-2700] p 800 A92-45542 HÖOKER, JOHN R. HUANG, X. Z. Spatial and temporal adaptive procedures for the Prediction of gas turbine combustor flow by a finite Prediction of leading-edge vortex breakdown on a delta unsteady aerodynamic analysis of airfoils using element code wing oscillating in roll unstructured meshes [AIAA PAPER 92-3469] p 906 A92-49016 [AIAA PAPER 92-2677] p 800 A92-45540 p 807 A92-45585 [AIAA PAPER 92-2694] IORDANOV, D. V. Spatial and temporal adaptive procedures for the HUANG, XI-JUN Investigation of the structural inhomogeneity of a unsteady aerodynamic analysis of airfoils using A time marching method in finite volume for transonic p 893 A92-47958 p 819 A92-47690 diffuser turbulent flows unstructured meshes ISHIL H. [NASA-TM-107635] **HUANG, XIAN** Numerical investigation of surge and rotating stall in

Study on two variable control plan for twin spool turbojet

p 862 A92-47697

multistage axial compressors

p 825 A92-48804

[AIAA PAPER 92-3193]

HOPKINS, HARRY

Through the looking glass

p 831 N92-29445

p 856 A92-46449

Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material

p 843 A92-45437 [SAE PAPER 912053] ISLAM, M.

Time-average loading on a two-dimensional airfoil in a large amplitude motion p 811 A92-46805 Nonlinear normal and axial force indicial responses for a two dimensional airfoil

p 830 N92-28888 [AD-A247196]

ISSAC, KAKKATTUKUZHY M.

Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726]

p 804 A92-45562 IVERSON, D. J.

Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective heating environment

p 852 N92-28721 INASA-TM-1039251

IWASAKI, AKIHITO

Experimental studies on aerodynamic characteristics of

SSTO vehicle at low subsonic speeds p 788 A92-45386 ISAE PAPER 9119811 Wind tunnel investigation of an improved upper surface

blown flap transport semi-span model p 789 A92-45395 (SAE PAPER 911993) Upgrading the data processing section of the NAL Gust

Wind Tunnel data processing system p 888 N92-28833 [NAL-TM-635]

IYER, VENKIT

Computational study of transition front on a swept wing leading-edge model [AIAA PAPER 92-2630] p 795 A92-45502

JACHIMOWSKI, CASIMIR J.

An analysis of combustion studies in shock expansion tunnels and reflected shock tunnels p 895 N92-28374

[NASA-TP-3224]

JACKSON, P. Harrier GR MK 5/7 mission simulators for the Royal p 885 N92-28540 Air Force

JACKSON, P. S.

Thin-airfoil correction for panel methods p 811 A92-46811

JACKSON, T. L.

Solutions of acoustic field problems using parallel p 925 A92-45929 computers

Analysis of results of an Euler-equation method applied

to leading-edge vortex flow

[NLR-TP-90368-U] p 827 N92-28657

JAMES, KEVIN D.

Full-scale high angle-of-attack tests of an F/A-18 [AIAA PAPER 92-2676] p 806 A92-4 p 806 A92-45584

JANG, CORY S.

Computational evaluation of an airfoil with a Gurney

IAIAA PAPER 92-27081 p 802 A92-45550

JANZEN, D. B.

Utility of ground simulation in flight control problem identification, solution development, and verification

p 883 N92-28525

JENG. YIH N.

Numerical study on a supersonic open cavity flow with geometric modification of aft bulkhead I AIAA PAPER 92-2627 I p 794 A92-45499

JENKINS, JAMES P.

Empirical foundations and sensitivity testing - Is it enough p 835 A92-45054 for the 90's?

JENNEY, GAVIN D.

Simple fly-by-wire actuator p 876 A92-48491 JENTINK, H. W.

Potential applications of laser Doppler anemometry for

in-flight measurements INI Ř-TP-90163-U I p 859 N92-28654

JEONG, DAVID Y.

Current DOT research on the effect of multiple site p 913 N92-30112 damage on structural integrity

JESIONEK, KRZYSZTOF J.

Total losses in turbulent flows inside conical diffusers p 819 A92-47782

JIA. GUO-RONG

Durability analysis for a main bulkhead subjected to load p 848 A92-47664 on the body of an aircraft

JIANG, JUN

Durability analysis for a main bulkhead subjected to load p 848 A92-47664 on the body of an aircraft

Wing leading edge design with composites to meet bird strike requirements p 848 A92-47404

JOHNS, ALBERT L.

Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept

n 860 A92-45316

JOHNSON, ERWIN H.

Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820

JOHNSON, LESLIE D.

Flexible manufacturing in repair of gas turbine engine p 786 A92-49049

IAIAA PAPER 92-35241

JOHNSON, M. C. Propulsion system performance and integration for high

Mach air breathing flight JOHNSON, MARK W

p 862 A92-46429 Effect of flow rate on loss mechanisms in a backswept p 897 A92-45606

JOHNSTON, LESLIE J.

Application of an unstructured Navier-Stokes solver to multi-element airfoils operating at transonic maneuver

conditions [AIAA PAPER 92-2638] p 796 A92-45507 Prediction of the viscous transonic aerodynamic

performance of supercritical aerofoil sections [AIAA PAPER 92-2653] p 805 A92-45569 JOHNSTON, NEIL

Organizational factors in human factors accident investigation p 834 A92-45000

JOHNSTON, RICHARD P.

A preliminary design and analysis of an advanced heat-rejection system for an extreme altitude advanced variable cycle diesel engine installed in a high-altitude advanced research platform

[NASA-CR-186021] p 871 N92-29427 JOLLY, BRUCE A.

An unstructured approach to the design of multiple-element airfoils p 807 A92-45592 [AIAA PAPER 92-2709]

JONES, T. V. Turbulent spot generation and growth rates in a transonic

boundary layer

IAD-A2502211 p 909 N92-29118 JORNA, P. G. A. M.

Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532

Aluminides modified by palladium - Protection of new

parts by local finishing [ONERA, TP NO. 1992-49] p 893 A92-48610 JOSYULA, ESWAR

Computation of hypersonic flowfields in thermal and chemical nonequilibrium

p 819 A92-47856 IAIAA PAPER 92-28741 JOURDEN, C.

Comparison between two 3D-NS-codes and experiment on a turbine stator

[AIAA PAPER 92-3042] p 822 A92-48703

JUDGE, CAROL L. Lessons learned about information management within

the Pilot's Associate program p 916 A92-44909

The application of particle image velocimetry (PIV) in a short-duration transonic annular turbine cascade [ASME PAPER 91-GT-221] p 899 A92-46825

K

KALENICHENKO, V. V.

Stability and inherent precision of two methods for solving motion and ablation equations for fireball-forming bodies in the earth atmosphere p 929 A92-46595

Simultaneous imaging and interferometric turbule visualization in a high-velocity mixing/shear layer p 896 A92-45130

KALKHORAN, IRAJ M.

Airfoil pressure measurements during oblique shock wave-vortex interaction in a Mach 3 stream

p 795 A92-45503 [AIAA PAPER 92-2631] p 795 A92-45503 Experimental investigation of the parallel vortex-airfoil interaction at transonic speeds p 813 A92-46901 KALLINDERIS, Y.

Prismatic grid generation with an efficient algebraic method for aircraft configurations

p 803 A92-45559 [AIAA PAPER 92-2721]

KALMAN, H.

The effect of tip convection on the performance and optimum dimensions of cooling fins p 902 A92-48354 KAMIYA, NOBUHIKO

Aero-structural integrated design of forward swept

wing |SAE PAPER 912021| KAMPA. K.

p 790 A92-45414

Experience with piloted simulation in the development of helicopters p 884 N92-28528 Experience with piloted simulation in the development

IMBB-UD-0610-91-PURI p 889 N92-30076 KAMPE, S. L.

Axial alignment of short-fiber titanium aluminide composites by directional solidification

p 892 A92-46838

KANDIL, HAMDY A.

Critical effects of downstream boundary conditions on vortex breakdown | AIAA PAPER 92-2601 | p 792 A92-45478

KANDIL, OSAMA

Critical effects of downstream boundary conditions on vortex breakdown I AIAA PAPER 92-2601 I p 792 A92-45478

KANG, JONGMIN The effect of molecular relaxation processes in air on

p 898 A92-45883 the rise time of sonic booms

Three-dimensional orthogonal-to-surface structured grid generation with transonic Navier-Stokes flow solutions for a commercial transport configuration

[AIAA PAPER 92-2616] p 793 A92-45490 KAPOOR, KAMLESH

Comparative study of turbulence models in predicting hypersonic inlet flows [AIAA PAPER 92-3098]

p 824 A92-48740 KASHIWABARA, Y.

Numerical investigation of surge and rotating stall in multistage axial compressors p 825 A92-48804

[AIAA PAPER 92-3193] KASSIES A

Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712

KASTELLA, KEITH Aircraft route optimization using adaptive simulated p 922 A92-48565

annealing KATSURAHARA, TADASHI Numerical analysis of RCS jet in hypersonic flights [SAE PAPER 912063] p 791 A92-45445

KATZ, AMNON

Flight model for unmanned simulated helicopters

p 874 A92-46776

p 791 A92-45445

p 855 A92-45449

KATZ, JOSEPH

Self-induced roll oscillations of low-aspect-ratio rectangular wings p 874 A92-46802

KAUFFMAN, R. E.

Lubricant evaluation and performance 2 p 895 N92-28398 [AD-A247464]

KAWAHARA, HIROYASU

A simulator study of a flight reference display for powered-lift STOL aircraft

[SAE PAPER 912067] KAWAHATA, NAGAKATU

In-flight simulation of backside operating models using direct lift controller

[SAE PAPER 912069] p 872 A92-45450

KAWAKAMI, YOSHIFUMI

Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 Predicted pressure distribution on a prop-fan blade p 810 A92-46791

through Euler analysis KAWAMURA, HIDEO

Study of grinding process and strength for ceramic heat insulated engine ISME PAPER MR91-1771 p 897 A92-45260

KAWIECKI, GRZEGORZ

Bilinear formulation applied to the stability and response p 847 A92-46930 of helicopter rotor blade

KAYABA, SHIGEO Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384

KEDDY, E. S. Analytical and experimental studies of heat pipe radiation cooling of hypersonic propulsion systems

[AIAA PAPER 92-3809] p 867 A92-49128

KEESEE, JOHN M.

Magnetic bearing design and control optimization for a four-stage centrifugal compressor p 900 A92-47188 KEITH, B. D.

Commercial turbofan engine exhaust nozzle flow

analyses using PAB3D [AIAA PAPER 92-2701] p 801 A92-45543 KELLER, JOHN

US Navy revisits escape modules p 849 A92-47975 KELLER, K. L. Utility of ground simulation in flight control problem identification, solution development, and verification

KELLER, M. A.

Lubricant evaluation and performance 2

p 895 N92-28398 LAD-A2474641

p 883 N92-28525

KELLEY, HENRY L. PERSONAL AUTHOR INDEX

KELLEY, HENRY L. KLANN GARY A KOSINOV A.D. Helicopter low-speed yaw control Contingency power for a small turboshaft engine by using Effect of a fan of rarefaction waves on the development p 879 N92-30025 [NASA-CASE-LAR-14219-1] vater injection into turbine cooling air of disturbances in a supersonic boundary layer p 809 A92-46519 n 871 N92-29661 KENDALL, E. R. [NASA-TM-105680] KLEB, W. L. The use and effectiveness of piloted simulation in KOSOWSKI, JANALEE M. Temporal adaptive Euler/Navier-Stokes algorithm transport aircraft research and development EICAS in an integrated cockpit p 855 A92-44922 p 886 N92-28549 involving unstructured dynamic meshes KOURTIDES, D. A. p 812 A92-46887 KERHO, M. Thermal response of rigid and flexible insulations and KLEB, WILLIAM L. LDV measurements on a rectangular wing with a reflective coating in an aeroconvective heating Characteristics of the Shuttle Orbiter leeside flow during simulated glaze ice accretion environment a reentry condition [AIAA PAPER 92-2690] p 800 A92-45537 INASA-TM-1039251 p 852 N92-28721 | AIAA PAPER 92-2951 | p 821 A92-47915 KOZLOVA, Z. M. KLEIN, K. Grid generation and compressible flow computations Oscillations of balloon-flight altitude Construction of a real-time DGPS experimental system p 836 A92-46660 about a high-speed civil transport configuration p 840 A92-47631 p 919 A92-47055 KRAL, L. D. KLYDE, DAVID H. KEY, DAVID L. Development and application of a zonal k-epsilon Effects of cockpit lateral stick characteristics on handling The use of ground based simulation for handling qualities turbulence model for complex 3-D flowfields qualities and pilot dynamics p 903 A92-48792 research: A new assessment p 885 N92-28545 IAIAA PAPER 92-3176] p 878 N92-28584 [NASA-CR-4443] KHALATOV, A. A. KRAMER, BRIAN R. KNIGHT, D. The flow pattern and external heat transfer investigation Forebody vortex control for suppressing wing rock on Interaction between crossing oblique shocks and a for gas turbine vanes end surfaces turbulent boundary layer a highly-swept wing configuration p 812 A92-46882 p 903 A92-48722 [AIAA PAPER 92-3071] [AIAA PAPER 92-2716] p 803 A92-45555 KNIGHT, PAUL D. KHAN, T. Design considerations for a modern telemetry KRAMMER, J. Practical architecture of design optimisation software for p 882 A92-47584 Advanced superalloys for turbine blade and vane processing and display system aircraft structures taking the MBB-Lagrange code as an applications KNOTT, P. G. IONERA, TP NO. 1992-21 p 893 A92-48578 Configuration effects on the ingestion of hot gas into p 851 N92-28471 KHODADOUST, A. p 842 A92-45315 Concurrent engineering in design of aircraft structures the engine intake KOBAYAKAWA, MAKOTO [MBB-FE-2-S-PUB-472] p 854 N92-29650 LDV measurements on a rectangular wing with a simulated glaze ice accretion Predicted pressure distribution on a prop-fan blade KRANTZ, T. L. [AIAA PAPER 92-2690] p 800 A92-45537 through Euler analysis p 810 A92-46791 Advanced Rotorcraft Transmission (ART) Program KOBAYASHI, A. S. KIDA, TAKASHI Tear straps in airplane fuselage [AIAA PAPER 92-3365] Quaternion and Euler angles in kinematics n 905 A92-48938 INAL-TM-6361 p 909 N92-28836 I AD-A248543 I p 854 N92-29511 KRANTZ, TIMOTHY KOBAYASHI, REIMON Dynamics of a split torque helicopter transmission KIM. BYOUNGSOO Impact response of composite UHB propeller blades p 910 N92-29136 BUWICE - An interactive icing program applied to engine INASA-TM-1056811 ISAE PAPER 912046] p 861 A92-45430 KRAUSS, R. H. inlets KOBYZHSKII, S. KrF laser-induced OH fluorescence imaging in a [AIAA PAPER 92-3179] p 922 A92-48794 Experimental investigation of liquid carbonhydrogen fuel supersonic combustion tunnel KIM, CHANG H. combustion in channel at supersonic velocities [AIAA PAPER 92-3346] p 905 A92-48923 Flow visualization studies of a sideslipping, p 894 A92-48986 [AIAA PAPER 92-3429] KRICKE, DIETER canard-configured X-31A-Like fighter aircraft model KÒC, A. Use of a virtual cockpit for the development of a future (AD-A2459401 p 829 N92-28883 Hypersonic flow past radiation-cooled surfaces [MBB-FE-202-S-PUB-0468-A] p 832 N93 ransport aircraft p 886 N92-28547 KIM. CHANGJU p 832 N92-29713 KRIEBĖL, J. Time accurate computation of unsteady transonic flows KODAMA, HIDEKAZU Hypersonic plasma predictions at nonzero angle of around an airfoil with oscillating flap on dynamic grid Application of non-reflecting boundary conditions to p 805 A92-45567 [AIAA PAPER 92-2733] (AIAA PAPER 92-3027) three-dimensional Euler equation calculations for thick p 925 A92-47028 KIM, J. M. KRIEBEL, JAMIE strut cascades Flow over a twin-tailed aircraft at angle of attack. II -[AIAA PAPER 92-3045] p 822 A92-48705 Computations of hypersonic flows around a Temporal characteristics p 810 A92-46781 three-dimensional concave/convex body KODAMA, MASARU KIM. JAI-MOO [AIAA PAPER 92-2606] p 805 A92-45570 Numerical simulation of a supersonic jet impingement Interaction between a rotor tip vortex and a separated KRIUCHENKO, V. V. on a ground flowfield p 814 A92-46947 Aerospace plane hydrogen scramjet boosting [SAE PAPER 912014] p 789 A92-45412 KIND, R. J. [SAE PAPER 912071] p 891 A92-45451 KOHALMI, DIANE Aerodynamic characteristics of hoar frost roughness KROO, ILAN A new development in embedded computer performance measurement p 921 A92-48506 p 808 A92-45829 Vortex-in-cell analysis of wing wake roll-up KING, JOHN E. [AIAA PAPER 92-2703] p 801 A92-45545 KOLAR, RAMESH An economic approach to accurate wing design KROTHAPALLI, A. Approach for analysis and design of composite rotor [SAE PAPER 912008] p 789 A92-45408 The enhancement of mixing in high-speed heated jets p 899 A92-46801 hladas using a counterflowing nozzle KING P I KOMAL I. [AIAA PAPER 92-3262] p 825 A92-48857 Wake mixing and performance measurements in a linear Combustion of solid fueled ramiet. II KRUCH, S. compressor cascade with crenulated trailing edges
[AIAA PAPER 92-3188] p 824 A92-[AIAA PAPER 92-3728] p 894 A92-49106 p 824 A92-48800 Numerical analysis of an engine turbine disk loaded with KOMERATH, N. M. a large number of thermomechanical cycles KINGSLEY, J. P. Quantification of canard and wing interactions using IONERA, TP NO. 1992-31] p 902 A92-48592 Prediction of a high bypass ratio engine exhaust nozzle spatial correlation velocimetry KRULL, J. D. p 807 A92-45588 [AIAA PAPER 92-2687] Three-dimensional-mode resonance in far wakes TAIAA PAPER 92-32591 p 864 A92-48855 Flow over a twin-tailed aircraft at angle of attack. II p 898 A92-46252 KINNEY, T. R. p 810 A92-46781 Temporal characteristics KUBRYNSKI, K. Integrated optic components for advanced turbine KOMERATH, NARAYANAN M. Two-point optimization of complete three-dimensional engine control systems p 925 A92-46248 Measurements of the unsteady vortex flow over a airplane configuration KINSEY, DON W. wing-body at angle of attack AIAA PAPER 92-2618] p 844 A92-45491 An unstructured approach to the design of 1 AIAA PAPER 92-27291 p 808 A92-45598 KUCHAR, A. P. multiple-element airfoils Scale model test results of a multi-slotted vectoring Interaction between a rotor tip vortex and a separated [AIAA PAPER 92-2709] p 807 A92-45592 2DCD ejector nozzle flowfield p 814 A92-46947 KIRTS, RICHARD E. p 864 A92-48859 I AIAA PAPER 92-3264 L KOMODA, MASAKI Paint removal using cryogenic processes KUCHAR, JAMES K. In-flight simulation of backside operating models using p 895 N92-28912 IAD-A2476681 Electronic presentation of instrument approach direct lift controller KISH, J. G. p 855 A92-44923 information (SAE PAPER 912069) p 872 A92-45450 Advanced Rotorcraft Transmission (ART) Program KUECK, J. D. KOOI, J. W. summary Assessment of valve actuator motor rotor degradation Comparison of LDA and LTA applications for propeller [AIAA PAPER 92-3365] p 905 A92-48938 by Fourier Analysis of current waveform tests in wind tunnels KISHIMOTO, TAKUJI [DE92-013233] p 909 N92-28814 [NLR-MP-88031-U] p 827 N92-28658 Multidimensional Euler/Navier-Stokes analysis for KUKREJA, R. T. KOOL, G. A. hypersonic equilibrium gas Segmental heat transfer in a pin fin channel with ejection Diffuser casing upgrade for an advanced turbofan ISAE PAPER 9120261 p 790 A92-45418 holes p 900 A92-47267 p 870 N92-28711 INLR-TP-90097-U] KUL. H. R. KISSLINGER, R. L. KORIVI, VAMSHI M. Verification and validation of F-15 and S/MTD unique 3-D numerical grid generation for the transonic flow Taylor series approximation of geometric shape variation p 921 A92-48515 analysis about multi-bodies software p 817 A92-47061 for the Euler equations p 899 A92-46916 KITAPLIOGLU, CAHIT KOSAI, M. Three-dimensional blade vortex interactions A simplified reaction mechanism for prediction of NO(x) emissions in the combustion of hydrocarbons p 815 A92-46953 Tear straps in airplane fuselage p 854 N92-29511 [AIAA PAPER 92-3340] KITOWSKI, J. V. [AD-A248543] p 894 A92-48919 Applied analytical combustion/emissions research at the Fighter airframe/propulsion integration - A General KOSHORST, J. Dynamics perspective Advanced composite components in airline service NASA Lewis Research Center

p 785 A92-47416

[NASA-TM-105731]

p 890 N92-29343

[AIAA PAPER 92-3332]

p 850 A92-48915

status and repair

KUNTZ, D. W. Comparison of interferometric measurements with 3-D Two-stream, supersonic, wake flowfield behind a thick A new vane swirler as applied to dual-inlet side-dump Euler computations for circular cones in supersonic flow base, I - General features p 813 A92-46895 combustor | AIAA PAPER 92-2691 | AIAA PAPER 92-3654 | p 906 A92-49085 p 800 A92-45538 KUNZ, R. F. LEE, TAE-HO Navier-Stokes investigation of a transonic centrifugal LANGE, H.-H. compressor stage using an algebraic Reynolds stress A study of the flammability limit of the backward facing The role of systems simulation for the development and step flow combustion qualification of ATTAS p 886 N92-28548 model [AIAA PAPER 92-3846] [AIAA PAPER 92-3311] p 895 A92-49136 p 825 A92-48897 LANGER, H.-J. LEE, YUN-KUN LAH-main rotor model test at the DNW KUNZ, ROBERT Development of the DDV actuation system on the IDF p 852 N92-28687 Explicit Navier-Stokes computation of turbomachinery INI R-TP-90305-UT aircraft flows LANGSTON, PAUL R. [SAE PAPER 912080] IAD-A2492841 p 909 N92-28879 p 844 A92-45455 Design and use of aramid fiber in aircraft structures LEEPER, KENNETH R. KUNZ, ROBERT F. Global memory in the Pave Pace architecture Explicit Navier-Stokes computation of turbomachinery LANSER, WENDY R. p 920 A92-48447 Analysis of a pneumatic forebody flow control concept about a full aircraft geometry flows LEGGETT, DAVID B. [AD-A248458] p 911 N92-29933 Analysis of the VISTA longitudinal simulation capability KURTS, DAVID [AIAA PAPER 92-2678] p 799 A92-45530 for a cruise flight condition p 876 A92-48488 The use of a dedicated testbed to evaluate simulator Forebody flow control on a full-scale F/A-18 aircraft LEGRAFF, J. E. p 884 N92-28533 training effectiveness 1 AIAA PAPER 92-26741 p 806 A92-45583 Turbulent spot generation and growth rates in a transonic KURZKE. J. Full-scale high angle-of-attack tests of an F/A-18 [AIAA PAPER 92-2676] p 806 A92-4 boundary layer Calculation of installation effects within performance p 806 A92-45584 (AD-A2502211 p 909 N92-29118 p 869 N92-28465 computer programs LANSHIN, A. I. LEINENWEVER, ROGER W. KUWAHARA, T. Aerospace plane hydrogen scramjet boosting Transport delay measurements: Methodology and Combustion of solid fueled ramjet. I p 891 A92-45451 analysis for the F-16C combat engagement trainer, ISAE PAPER 9120711 p 894 A92-49105 [AIAA PAPER 92-3727] LAOR, K. display for advanced research and training, and the F-16A limited field of view KWAK, YEONG-LAE The effect of tip convection on the performance and optimum dimensions of cooling fins p 902 A92-48354 IAD-A2485191 Development of a flight information system using the p 888 N92-29505 LEISHMAN, J. G. structured method LAR'KIN, NIKOLAI A. [AD-A248207] p 859 N92-29222 A study of rotor wake development and wake/body Smooth solutions for transonic gasdynamic equations interactions in hover [ISBN 5-02-029345-8] p 813 A92-46935 p 809 A92-46626 LENAKOS, JASON LARROQUE, PIERRE Measurements of the unsteady vortex flow over a The role of simulation for the study of APIS (piloting wing-body at angle of attack
[AIAA PAPER 92-2729] support by synthetic imagery) p 885 N92-28544 p 808 A92-45598 LABOURDETTE, ROGER LAU, S. C. LENGRAND, J. C. Survey of French activities concerning structural Segmental heat transfer in a pin fin channel with ejection airworthiness and aging aircraft p 838 N92-30130 Numerical and experimental investigation of rarefied p 900 A92-47267 holes compression corner flow LABRUJERE, T. E. LAUFER, G. [AIAA PAPER 92-2900] p 820 A92-47876 Evaluation of measured-boundary-condition methods for KrF laser-induced OH fluorescence imaging in a LENSKI, JOSEPH W., JR. 3D subsonic wall interference supersonic combustion tunnel Boeing Helicopters Advanced Rotorcraft Transmission [NLR-TR-88072-U] p 832 N92-29884 [AIAA PAPER 92-3346] p 905 A92-48923 (ART) Program summary of component tests LADD, J. A. LAUGHREY, JAMES A. p 905 A92-48937 [AIAA PAPER 92-3364] Development and application of a zonal k-epsilon Results and lessons learned from the STOL and LENTINI. D. turbulence model for complex 3-D flowfields Maneuver Demonstration Program Prediction of gas turbine combustor flow by a finite [AIAA PAPER 92-3176] p 903 A92-48792 [SAE PAPER 912005] p 843 A92-45406 element code LAFON, J. LAUZE, Y. [AIAA PAPER 92-3469] p 906 A92-49016 Acquisition of an aerothermodynamic data base by Interactive generation of structured/unstructured LEON-SALAMANCA, TEODORO means of a winged experimental reentry vehicle [MBB/FE202/S/PUB/461] p 787 NS surface meshes using adaptivity p 919 A92-47066 Surface residual stress analysis of metals and alloys p 787 N92-30232 LAWRYSYN, M. A. 1AD-A2483721 p 895 N92-28426 LAI, CHEN-YAN LERCH, MANFRED Aerodynamic characteristics of hoar frost roughness Development of the DDV actuation system on the IDF A semi empirical method for the analytical representation aircraft of stationary measured profile coefficients for applications LE BALLEUR, J. C. [SAE PAPER 912080] p 844 A92-45455 Calculation of fully three-dimensional separated flows of rotary wing aerodynamics LAKSHMINARAYANA, B. with an unsteady viscous-inviscid interaction method [FTN-92-91491] p 832 N92-29741 Navier-Stokes investigation of a transonic centrifugal LERWICK, TRYGVE R. p 821 A92-48577 IONERA TP NO 1992-11 compressor stage using an algebraic Reynolds stress System for generating sequences of phased gust or taxi LE MEUR, A. p 845 A92-46800 model Comparison between two 3D-NS-codes and experiment loadings [AIAA PAPER 92-3311] p 825 A92-48897 LEVI, KEITH R. on a turbing stator Investigation of three-dimensional flow field in a turbine [AIAA PAPER 92-3042] An explanation-based-learning approach to knowledge p 822 A92-48703 including rotor/stator interaction. I - Design development compilation - A Pilot's Associate application LE, DY D. Engine fan blade low cycle fatigue testing and performance of the research facility p 920 A92-48220 p 883 A92-48908 [AIAA PAPER 92-3478] [AIAA PAPER 92-3325] The importance of implicit and explicit knowledge in a p 866 A92-49021 p 858 A92-48567 LEBACQZ, J. VICTOR Investigation of three-dimensional flow field in a turbine pilot's associate system Rotorcraft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for LEVIN, DANIEL including rotor/stator interaction. II - Three-dimensional flow field at the exit of the nozzle Self-induced roll oscillations of low-aspect-ratio [AIAA PAPER 92-3326] rectangular wings p 874 A92-46802 p 826 A92-48909 the 1990's [NASA-TM-103873] LEVIN, DEBORAH A. Explicit Navier-Stokes computation of turbomachinery p 853 N92-28926 LEBALLEUR, J. C. Examination of ultraviolet radiation theory for bow shock flows p 909 N92-28879 Development of an unsteady three-dimensional rocket experiments [AD-A249284] viscous-inviscid interaction numerical method for the LAKSHMINARAYANA, BUDUGUR I AIAA PAPER 92-2871 I p 901 A92-47853 calculation of airfoils vibration Explicit Navier-Stokes computation of turbomachinery LEWANDOWSKI, JANUSZ p 830 N92-29206 [ONERA-RSF-7/3617-AY-022A] flows Concept of a one-dimensional model of the dynamic LECLERCO, M. C. behavior of a gas turbine p 862 A92-47791 IAD-A2484581 p 911 N92-29933 Industrial practice in aeronautical maintenance LEWICKI, D. G. LAM. C. G. p 786 A92-47774 Efficient high-resolution rotor wake calculations using Application of face-gear drives in helicopter LEE, B. H. K. p 814 A92-46951 flow field reconstruction transmissions Unsteady pressure and load measurements on an I NASA-TM-1056551 p 908 N92-28434 LAMERIS, J. F/A-18 vertical fin at high-angle-of-attack LEWIS, JESS The use of load enhancement factors in the certification p 798 A92-45529 I AIAA PAPER 92-26751 The FAA aging airplane program plan for transport of composite aircraft structures Statistical prediction of maximum buffet loads on the p 852 N92-28649 [NLR-TP-90068-U] aircraft p 838 N92-30128 E/A-18 vertical fin p 811 A92-46816 LEWIS, LIANE C. LAN, C. E. LEE, DONGHO Experimental study of vortex flows over delta wings in An experimental investigation of the effect of Time accurate computation of unsteady transonic flows wing-rock motion leading-edge extensions on directional stability and the p 810 A92-46787 around an airfoil with oscillating flap on dynamic grid effectiveness of forebody nose strakes LEWIS, TIMOTHY J. I AIAA PAPER 92-27331 p 805 A92-45567 p 802 A92-45554 [AIAA PAPER 92-2715] LEE, GEORGE Experimental pyrometer system for a gas turbine Study of optical techniques for the Ames unitary wind LAN. C. EDWARD enaine Identification of aerodynamic models for maneuvering | AIAA PAPER 92-3482 | p 859 A92-49022 tunnels. Part 3: Angle of attack [NASA-CR-190541] LEWY, SERGE p 888 N92-29655 INASA-CR-1904441 p 852 N92-28720 Research and studies on quiet helicopters LEE, JAEWOO [ONERA, TP NO. 1992-59] Aerodynamically blunt and sharp bodies
[AIAA PAPER 92-2727] p 80 p 926 A92-48618 LANDGRAF, R. W. Advances in fatigue lifetime predictive techniques; p 808 A92-45597 LEYLAND, JANE A.

Proceedings of the Symposium, San Francisco, CA, Apr.

p 896 A92-45226

24 1990 [ASTM STP-1122] LEE, KAM-PUI

[AIAA PAPER 92-2897]

Enhancements to viscous-shock-layer technique

p 820 A92-47873

p 878 N92-28457

Comparison of three controllers applied to helicopter

INASA-TM-1021921

p 880 A92-45027

LEYLAND, P.	LOISY, JEAN	MACISAAC, B. D.
Mesh adaption for 2D transsonic Euler flows on unstructured meshes p 816 A92-47038	Steady and transient performance calculation method for prediction, analysis, and identification	Engine performance and health monitoring models using steady state and transient prediction methods
LI. FENG	p 869 N92-28461	p 870 N92-28467
The numerical simulation of compressible flow around	LOKEN, G.	MACLIN, JAMES R.
an airfoil at high angle of attack p 818 A92-47686	Space Shuttle Orbiter auxiliary power unit status	Performance of fuselage pressure structure
LI, GUI-WEN	[SAE PAPER 912060] p 889 A92-45442 LONGLEY, J. P.	p 913 N92-30109
Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664	Inlet distortion effects in aircraft propulsion system	MACRORIE, MICHAEL Experimental development of spanwise vortex models
LI, WEI-LIN	integration p 869 N92-28464	with streamwise decay due to wall interaction
BUWICE - An interactive icing program applied to engine	LOOIJE, C. E. W.	[AIAA PAPER 92-2688] p 799 A92-45535
inlets	Diffuser casing upgrade for an advanced turbofan [NLR-TP-90097-U] p 870 N92-28711	MADDOCK, BLAIR C.
[AIAA PAPER 92-3179] p 922 A92-48794	LORD, JEFFREY R.	Anodize and prime your aluminum without environmental
LIANG, D. W. Improved method for estimation of the maximum	Wavelength encoded fiber optic angular displacement	headaches p 892 A92-47340 MADNIA, C. K.
instantaneous distortion values	sensor p 857 A92-48046	Modeling of the reactant conversion rate in a turbulent
[AIAA PAPER 92-3623] p 826 A92-49076	LORDON, J. A new automatic grid generation environment for CFD	shear flow p 829 N92-28820
LIEBECK, R. H.	applications	MAEKAWA, SHOUZO
Laminar separation bubbles and airfoil design at low	[AIAA PAPER 92-2720] p 803 A92-45558	Aerodynamic heating in three-dimensional shock wave
Reynolds numbers [AIAA PAPER 92-2735] p 797 A92-45515	LOTH, JOHN L.	turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows
LILLEY, ROBERT W.	Pulse jet one-way valve performance [AIAA PAPER 92-3169] p 863 A92-48790	[SAE PAPER 912044] p 791 A92-45428
Loran-C performance assurance assessment program	LOUTON, STEVEN E.	MAGNESS, C.
[NASA-CR-190469] p 840 N92-28718	Use of simulation in the USAF Test Pilot School	Unsteady crossflow on a delta wing using particle image
LIN, C. A. Predictions of a turbulent backward-facing-step flow with	curriculum p 884 N92-28535 LOVATO, J. A.	velocimetry p 811 A92-46804 MAIDA, JOHN L.
a cubic pressure-strain model	Active control of vortex structures in a separating flow	Fiber optic speed sensor for advanced gas turbine
[AIAA PAPER 92-2647] p 796 A92-45514	over an airfoil	engine control p 857 A92-48044
LIN, C. K.	[AIAA PAPER 92-2728] p 804 A92-45563	MALCHODI, LAWRENCE A.
Nonuniform motion of leading-edge vortex breakdown	LOWE, D. M. Thermal response of rigid and flexible insulations and	New Boeing flight test data acquisition systems
on ramp pitching delta wings p 808 A92-45828 LIN, FU-JIA	reflective coating in an aeroconvective heating	p 920 A92-47537 MALCOLM, GERALD N.
Probability analysis of structure failure for the wings with	environment	Forebody vortex control for suppressing wing rock on
main and subordinate components p 848 A92-47657	[NASA-TM-103925] p 852 N92-28721	a highly-swept wing configuration
LIN, JOHN C.	LU, YI Sensitivity analysis of discrete periodic systems with	[AIAA PAPER 92-2716] p 803 A92-45555
Separation control on high Reynolds number multi-element airfoils	applications to helicopter rotor dynamics	Experimental study of vortex flows over delta wings in wing-rock motion p 810 A92-46787
[AIAA PAPER 92-2636] p 806 A92-45575	p 846 A92-46884	Forebody vortex control using small, rotatable strakes
LIN, YUAN	LUCJANEK, WIESLAW	p 811 A92-46798
Reconstruction of flight path in turbulence p 874 A92-46777	Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783	MALHOTRA, SUBHASH Optics in aircraft engines p 926 A92-48500
LINCOLN, JOHN W.	A new method of helicopter rotor blade motion control	MALIK, M. R.
Damage tolerance for commuter aircraft	p 875 A92-47786	Discrete modes and continuous spectra in supersonic
p 914 N92-30114	LUFFY, RONALD J. A study on the impact of shroud geometry on ejector	boundary layers p 809 A92-46264
LINDSLEY, MICHELLE Using design of experiments to improve product and	pumping performance	MALIK, MUJEEB R. Gortler instability and supersonic quiet nozzle design
process integrity p 928 A92-48555	[AIAA PAPER 92-3260] p 864 A92-48856	p 813 A92-46902
LIOU, SHIUH-GUANG	LUKENS, W.	MALKOV, V. A.
Measurements of the unsteady vortex flow over a	Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92-45442	The flow pattern and external heat transfer investigation
wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598	LUNDGREN, T. S.	for gas turbine vanes end surfaces [AIAA PAPER 92-3071] p 903 A92-48722
Interaction between a rotor tip vortex and a separated	Microburst modelling and scaling p 915 A92-46262	MALL, SHANKAR
flowfield p 814 A92-46947	LUSCH, THOMAS G.	Elevated temperature crack growth in aircraft engine
	Real targets, unreal displays - The inadvertent	materials p 891 A92-45234 MALLOY, P. J.
LISCINSKY, D. S.	Suppression of critical radar data 0 839 A92-44969	
Experimental study of cross-stream mixing in a	suppression of critical radar data p 839 A92-44969 LUTTGES, MARVIN W.	
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735	LUTTGES, MARVIN W. Static and dynamic flow field development about a	Design load predictions on a fighter-like aircraft wing p 811 A92-46797
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45222 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a <i>Voronoi type method</i> p 918 A92-47043 MARBLE, FRANK E.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45222 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45222 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Vornoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data fink processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MB8040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Vornoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E.	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F.
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data fink processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47664 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MACEDO MAURA, GERALDO A.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data fink processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils p 818 A92-47096 MARC, JEAN-PIERRE Trends in commercial aircraft design · What evolution
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts p 873 A92-46752 LO, CHING F. Wind-tunnel compressor stall monitoring using neural	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing {AIAA PAPER 92-2628} p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-466262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils p 818 A92-47096 MAREC, JEAN-PIERRE Trends in commercial aircraft design - What evolution factors and what approach?
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers p 810 A92-46778 LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47664 LIU, WEN-TING A study on crack initiation method for durability analysis p 901 A92-47663 Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives p 892 A92-46631 M MA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MACEDO MAURA, GERALDO A. Approach for analysis and design of composite rotor blades MACINA, O.	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data fink processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils p 818 A92-47096 MARC, JEAN-PIERRE Trends in commercial aircraft design · What evolution
Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 LITTLE, ERIC J. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 LITVIN, F. L. Application of face-gear drives in helicopter transmissions [NASA-TM-105655] p 908 N92-28434 LIU, C. H. Critical effects of downstream boundary conditions on vortex breakdown [AIAA PAPER 92-2601] p 792 A92-45478 LIU, D. D. Comment on 'Canard-wing interaction in unsteady supersonic flow' p 812 A92-46820 LIU, HT. Unsteady aerodynamics of a Wortmann wing at low Reynolds numbers LIU, SONG-LING A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 LIU, WEN-TING A study on crack initiation method for durability analysis Durability analysis for a main bulkhead subjected to load on the body of an aircraft p 848 A92-47664 LIVNE, E. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts P 873 A92-46752 LO, CHING F. Wind-tunnel compressor stall monitoring using neural networks P 918 A92-48817	LUTTGES, MARVIN W. Static and dynamic flow field development about a porous suction surface wing [AIAA PAPER 92-2628] p 795 A92-45500 LYCANS, RANDAL W. Heat transfer to a cylinder submerged in a rectangular cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913 LYDON, T. Remote telemetry concepts p 882 A92-47562 LYKOV, O. P. Enhancing the performance characteristics of engine fuels by means of surfactant additives MMA, EDWARD C. A transonic/supersonic/hypersonic CFD analysis of the entry Space Shuttle Orbiter [AIAA PAPER 92-2614] p 805 A92-45571 MAARSINGH, T. A. Evaluation of measured-boundary-condition methods for 3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884 MABEY, D. G. Effect of model cooling on periodic transonic flow p 813 A92-46900 MACE, JAMES Fighter airframe/propulsion integration - A McDonnell Aircraft perspective [AIAA PAPER 92-3333] p 850 A92-48916 MACEDO MAURA, GERALDO A. Approach for analysis and design of composite rotor blades p 899 A92-46801	Design load predictions on a fighter-like aircraft wing p 811 A92-46797 MANDERS, P. J. H. M. Application of VME-technology on an airborne data link processor unit [NLR-MP-88040-U] p 841 N92-29615 MANNING, S. D. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 MANSFIELD, FRANK A. Investigation of solution operators for the three-dimensional Euler equations [AIAA PAPER 92-2666] p 797 A92-45522 MANSOUR, N. N. Microburst modelling and scaling p 915 A92-46262 MANTEL, B. Anisotropic control of mesh generation based upon a <i>Vornoi type method</i> p 918 A92-47043 MARBLE, FRANK E. Shock enhancement and control of hypersonic combustion [AD-A248558] p 896 N92-29580 MARCHANT, M. J. Mesh adaptivity with the quadtree method p 816 A92-47041 MARCILLAT, J. Experimental and numerical study of flow around helicopter rotor blade tips p 814 A92-46948 MARCONI, F. Orthogonal grids for multiple airfoils P 818 A92-47096 MAREC, JEAN-PIERRE Trends in commercial aircraft design - What evolution factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587

p 815 A92-46958

thickening
[AIAA PAPER 92-2707]

p 801 A92-45549

MARINI, M.

MEIER, C.

MARINI, M.	MATTHEWS, WILLIAM T.	MEIER, C.
Viscous high-speed flow computations by adaptive mesh	A sensitivity analysis on component reliability from	Construction of a real-time DGPS experimental system
embedding techniques p 808 A92-45839 MARKHAM, K. C.	fatigue life computations [AD-A247430] p 908 N92-28425	p 840 A92-47631 MELAKE, A.
Time-to-go estimation from infrared images	MAUGHMER, MARK D.	Numerical flow simulation and analysis of a shrouded
p 840 A92-48308	Simplified linear stability transition prediction method for	propfan rotor
MARKIEWICZ, JANUSZ	separated boundary layers p 812 A92-46883	[AIAA PAPER 92-3773] p 826 A92-49118
Modeling of the control systems of rotary wing aircraft	MAURINO, DANIEL E.	MENEGOZZI, LIONEL
(Review) p 875 A92-47783	ICAO Flight Safety and Human Factors Programme	A neural network based postattack damage assessment
MARKIN, ROBERT E.	p 835 A92-45055	system p 922 A92-48520
Specifying exhaust nozzle contours in real-time using	MAUS, J. R.	MENNE, S.
genetic algorithm trained neural networks	Calculation of high speed base flows	Computation of 3-D hypersonic flows in chemical
[AIAA PAPER 92-3328] p 865 A92-48911	[AIAA PAPER 92-2679] p 799 A92-45531	non-equilibrium including transport phenomena
MARLER, J. E.	MAVRIPLIS, D. J.	[AIAA PAPER 92-2876] p 820 A92-47858
Reliability centered maintenance for metallic airframes	Unstructured and adaptive mesh generation for high	MENON, SURESH Computations of hypersonic flows around a
based on a stochastic crack growth approach p 897 A92-45242	Reynolds number viscous flows p 816 A92-47042	Computations of hypersonic flows around a three-dimensional concave/convex body
MARRISON, CLAIRE	MAYLE, R. E.	[AIAA PAPER 92-2606] p 805 A92-45570
The effect on aircraft evacuations of passenger	Boundary-layer measurements during a parallel	MERBOTH, LAWRENCE J.
behaviour and smoke in the cabin p 834 A92-44998	blade-vortex interaction	A high performance general purpose processing element
MARSHALL, T. A.	[AIAA PAPER 92-2623] p 794 A92-45495	for avionic applications p 920 A92-48440
Computation of turbulent, separated, unswept	MAZUR, VLADISLAV	MERET, G.
compression ramp interactions p 813 A92-46897	Aircraft-triggered lightning - Processes following strike	Industrial practice in aeronautical maintenance
MARTIN, CARL J., JR.	initiation that affect aircraft p 836 A92-46784	p 786 A92-47774
Combined load test apparatus for flat panels	MCARDLE, JACK G.	MERIENNE, M. C.
[NASA-CASE-LAR-14698-1] p 911 N92-30028	Experimental and analytical study of close-coupled	Feasibility study of hypersonic clinometric
MARTIN, CHARLES A.	ventral nozzles for ASTOVL aircraft p 861 A92-45325	measurements at R3Ch
Advanced pneumatic impulse ice protection system	Internal reversing flow in a tailpipe offtake configuration	[ONERA-RSF-136/1865-AY-728-] p 829 N92-28789
(PIIP) for aircraft p 845 A92-46807	for SSTOVL aircraft	MERLINI, TEODORO
MARTIN, R. A. Analytical and experimental studies of heat pipe radiation	[NASA-TM-105698] p 868 N92-28418	Linear analysis of naturally curved and twisted anisotropic beam p 899 A92-46936
cooling of hypersonic propulsion systems	MCCLINTON, C. R.	anisotropic beam p 899 A92-46936 MERRIGAN, M. A.
I AIAA PAPER 92-3809] p 867 A92-49128	A comparative study of scramjet injection strategies for	Analytical and experimental studies of heat pipe radiation
MARTINEZ-VAL, RODRIGO	high Mach numbers flows	cooling of hypersonic propulsion systems
Optimum cruise lift coefficient in initial design of jet	[AIAA PAPER 92-3287] p 904 A92-48876	[AIAA PAPER 92-3809] p 867 A92-49128
aircraft p 845 A92-46806	MCDANIEL, J. C., JR.	MESANDER, GEERT A.
MARTINSON, SCOTT D.	KrF laser-induced OH fluorescence imaging in a	Results of a low power ice protection system test and
Active thermal isolation for temperature responsive	supersonic combustion tunnel [AIAA PAPER 92-3346] p 905 A92-48923	a new method of imaging data analysis
sensors	, , , , , , , , , , , , , , , , , , , ,	[NASA-TM-105745] p 828 N92-28696
[NASA-CASE-LAR-14612-1] p 911 N92-29954	MCDONELL, V. G.	METZGER, FREDERICK B.
MARYNIAK, JERZY	The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine	Predicted pressure distribution on a prop-fan blade
Mathematical modeling of the flight of passenger aircraft	combustor swirl cup	through Euler analysis p 810 A92-46791
in the case of engine failure p 875 A92-47777	[AIAA PAPER 92-3231] p 863 A92-48832	MEYER, FRIEDRICH-WILHELM
Mathematical modeling of the effect of windshear on	MCFARLAND, RICHARD H.	A Mach-scaled powered model for rotor-fuselage
the dynamics of a landing aircraft p 875 A92-47784	The appropriate concern for possible aberrations in	interactional aerodynamics and flight mechanics
MARZE, HENRI-JAMES	landing guidance signals p 839 A92-44932	investigations p 847 A92-46960
Research and studies on quiet helicopters	MCGHEE, ROBERT J.	MEYER, GEORGE
[ONERA, TP NO. 1992-59] p 926 A92-48618	Separation control on high Reynolds number	Nonlinear control design for slightly nonminimum phase
MASAD, J. A.	multi-element airfoils	systems - Application to V/STOL aircraft
Effect of a bulge on the subharmonic instability of subsonic boundary layers p 898 A92-45833	[AIAA PAPER 92-2636] p 806 A92-45575	p 876 A92-48160 MEYN, LARRY A.
MASLOV, A. A.	MCGUIRE, FRANK G.	Analysis of a pneumatic forebody flow control concept
Effect of a fan of rarefaction waves on the development	Airport X-ray screening technology becomes a viable	about a full aircraft geometry
of disturbances in a supersonic boundary layer	explosives detector p 836 A92-47925	[AIAA PAPER 92-2678] p 799 A92-45530
p 809 A92-46519	MCGUIRE, JACK F.	Forebody flow control on a full-scale F/A-18 aircraft
MASON, JOHN L.	Structural integrity of future aging airplanes	[AIAA PAPER 92-2674] p 806 A92-45583
The impact of advanced materials on small turbine	p 913 N92-30107	Full-scale high angle-of-attack tests of an F/A-18
engines	MCGUIRE, ROBERT	[AIAA PAPER 92-2676] p 806 A92-45584
[SAE PAPER 911207] p 862 A92-48021	Drop test: Cessna Golden Eagle 421B	MIAU, J. J.
MACON W LI	[DOT/FAA/CT-TN91/32] p 837 N92-28900	Nonuniform motion of leading-edge vortex breakdown
MASON, W. H.		on rome sitching deltaings
Applied Computational Aerodynamics - Case studies	MCGUIRK, J.	on ramp pitching delta wings p 808 A92-45828
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580	Prediction and measurement of jet flowfield features for	MICHALSKI, WIESLAW J. J.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A.	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE)	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE)	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S.	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912081] p 791 A92-45443	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R.	MICHALSKI, WIESLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 MATSUZAKI, KATSUYA Preliminary study of algorithm for real-time flutter monitoring	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 MEHTA, JAYESH M.	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ Concept of a one-dimensional model of the dynamic
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 MATSUZAKI, KATSUYA Preliminary study of algorithm for real-time flutter	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 MEHTA, JAYESH M. A distributed vaporization time-tag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912051] p 843 A92-45437 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912051] p 843 A92-45437 MATSUZAKI, KATSUYA Preliminary study of algorithm for real-time flutter monitoring [SAE PAPER 912001] p 897 A92-45403 MATSUZAKI, YUJI	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 MEHTA, JAYESH M. A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014 MEI, CHUH	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791 MILLER, CHRISTOPHER A.
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUMIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 MATSUZAKI, KATSUYA Preliminary study of algorithm for real-time flutter monitoring [SAE PAPER 912001] p 897 A92-45403 MATSUZAKI, YUJI Response characteristics of a wing in supersonic flow	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNEESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 MEHTA, JAYESH M. A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014 MEI, CHUH Nonlinear analyses of composite aerospace structures	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791 MILLER, CHRISTOPHER A. An explanation-based-learning approach to knowledge
Applied Computational Aerodynamics - Case studies [AIAA PAPER 92-2661] p 845 A92-45580 Aerodynamically blunt and sharp bodies [AIAA PAPER 92-2727] p 808 A92-45597 MASSON, A. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 MATSUDA, YUKIO Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 MATSUMOTO, HIROYUKI Manual control of vehicles with time-varying dynamics [SAE PAPER 912078] p 917 A92-45454 MATSUMOTO, MASASHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MATSUO, SHIGERU Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912051] p 843 A92-45437 MATSUSHIMA, MASAMICHI Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912051] p 843 A92-45437 MATSUZAKI, KATSUYA Preliminary study of algorithm for real-time flutter monitoring [SAE PAPER 912001] p 897 A92-45403 MATSUZAKI, YUJI	Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 MCKEON, MARK F. Tasking and communication flows in the F/A-18D cockpit: Issues, problems, and possible solutions [AD-A245977] p 853 N92-28802 MCMILLIN, R. D. Segmental heat transfer in a pin fin channel with ejection holes p 900 A92-47267 MCNESE, MICHAEL D. Identifying design requirements using integrated analysis structures p 922 A92-48527 MCRAE, D. S. A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations [AIAA PAPER 92-2643] p 796 A92-45510 Numerical simulations using a dynamic solution-adaptive grid algorithm, with applications to unsteady internal flows [AIAA PAPER 92-2719] p 803 A92-45557 MCRAE, M. M. Manufacturing technology methodology for propulsion system parts [AIAA PAPER 92-3525] p 906 A92-49048 MCWITHEY, ROBERT R. Combined load test apparatus for flat panels [NASA-CASE-LAR-14698-1] p 911 N92-30028 MEHTA, JAYESH M. A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014 MEI, CHUH	MICHALSKI, WIEŠLAW J. J. Aircraft stabilization at large angles of attack p 875 A92-47785 MICHEL, ULF Jet aircraft noise at high subsonic flight Mach numbers [DLR-FB-91-28] p 928 N92-29997 MIDKIFF, M. Liquid flow-through cooling for avionics applications p 902 A92-48448 MIGINIAC, ROLAND The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 MIHALOEW, JAMES R. Integrated flight/ propulsion control for supersonic STOVL aircraft p 872 A92-45320 MIKKELSEN, KEVIN L. Experience in the operation of a hypersonic nozzle static thrust stand [AIAA PAPER 92-3292] p 882 A92-48881 MILES, JOHN B. Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 MILFORD, C. M. Configuration effects on the ingestion of hot gas into the engine intake p 842 A92-45315 MILLER, ANDRZEJ Concept of a one-dimensional model of the dynamic behavior of a gas turbine p 862 A92-47791 MILLER, CHRISTOPHER A.

MATTHEWS, WILLIAM T.

MILLER, GLEN E. MILLER, GLEN E. Application of analog fiber optic position sensors to flight control systems p 857 A92-48042 MILLER, MILES C. Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Branch [AD-A247489] p 883 N92-28248 MILLS, H. L. 24-bit flight test data recording format p 900 A92-47528 MINTO, K. D. Compensating for manufacturing and life-cycle variations in aircraft engine control systems p 868 A92-49139 I AIAA PAPER 92-38691 MISHLER, R. Emerging airframe/propulsion integration technologies at General Electric [AIAA PAPER 92-3335] p 850 A92-48917 MITANI, TOHRU validation of Experimental scramiet nozzle performance p 864 A92-48879 [AIAA PAPER 92-3290] MITCHELL, DAVID G. The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics INASA-CR-44431 p 878 N92-28584 MITCHELL, M. R. Advances in fatigue lifetime predictive techniques; Proceedings of the Symposium, San Francisco, CA, Apr. 24 1990 [ASTM STP-1122] p 896 A92-45226 MITCHELL, N. A. ASTOVL propulsion systems configuration and concept p 842 A92-45312 MIYACHI, TOSHIO An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines p 861 A92-45431 [SAE PAPER 912047] Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 MIYAJIMA, HIROSHI Experimental validation of scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879 MÎYAKAWA, JUNICHI Aero-structural integrated design of forward swept [SAE PAPER 912021] p 790 A92-45414 MIYAKE, S. Strength evaluation and safety of machine/structure. III Case examples on strength and safety evaluation of

machine/structure 3.2 aircraft (airframe) p 882 A92-47303

Numerical analysis of RCS jet in hypersonic flights [SAE PAPER 912063] p 791 A92-45445 MIYAMOTO, YOSHIT

Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA' SAE PAPER 912010] p 843 A92-45410

MIYAMOTO, YOSHITO
Experimental studies on aerodynamic characteristics of

SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386 MÌYASHITA, JUNICHI

Aerodynamic development of boundary layer control system for NAL OSTOL research aircraft 'ASKA' [SAE PAPER 912010] p 843 A92-45410

MNICH, JASON Non-chromated anodize process for corrosion

p 892 A92-47341 resistance and adhesive bonding

Construction of a numerical optimization method for the definition of hypersupported profiles

p 908 N92-28788 [ONERA-RSF-43/1736-AY-146A] MÔLVIK, G. A.

Calculation of high speed base flows

1 AIAA PAPER 92-2679] p 799 A92-45531 MOLVIK, GREGORY A.

Analysis of a hydrocarbon scramjet with augmented preburning [AIAA PAPER 92-3425]

p 865 A92-48984 MONGIA, HUKAM C. Analytical design and demonstration of a low-cost

expendable turbine engine combustor | AIAA PAPER 92-3754 | p 867 A92-49112

MONTGOMERY, LEON

Pulse jet one-way valve performance

[AIAA PAPER 92-3169] p 863 A92-48790 MOODY, CHRIS

Operational evaluation of a tower workstation for clearance delivery p 879 A92-44981

MOORE, FRANK G.

Second-order shock-expansion theory extended to include real gas effects [AD-A247191] p 831 N92-29539

MOORE, JAMES A.

The relationship between mode localization and energy transmission parameters in the vibration of coupled p 925 A92-45921 structures

MOORHOUSE, DAVID J. Results and lessons learned from the STOL and Maneuver Demonstration Program

[SAE PAPER 912005]

p 843 A92-45406 MORAN, SUSANNE 1.

Transport delay measurements: Methodology and analysis for the F-16C combat engagement trainer, the display for advanced research and training, and the F-16A limited field of view [AD-A248519] p 888 N92-29505

MORAWSKI, JANUSZ M.

Safety vs. economy, system-theoretic approach to the p 916 A92-45002 problem analysis

MOREAU JEAN-PATRICK

Aircraft-triggered lightning - Processes following strike initiation that affect aircraft p 836 A92-46784

Orthogonal grids for multiple airfoils p 818 A92-47096

MOREUX, V. A new automatic grid generation environment for CFD applications

[AIAA PAPER 92-2720] p 803 A92-45558

MORGAN, BEN B., JR. An analysis of aircrew communication patterns and content [AD-A246618] p 907 N92-28253

MORIKAWA, YASUSHI

An acrobatic airship 'Acrostat'

[SAE PAPER 911994] p 843 A92-45396 High-altitude lighter-than-air powered platform p 844 A92-45438 ISAE PAPER 912054)

MORINISHI, KOJI A finite difference solution of the Euler equations on

non-body-fitted Cartesian grids p 818 A92-47153 Numerical solutions of unsteady oscillating flows past an airfoil

[AIAA PAPER 92-3212] p 825 A92-48817

MORINO, L.

A new integral equation for potential compressible aerodynamics of rotors in forward flight

p 815 A92-46958

p 826 A92-49088

MORITA, YOSHIO

Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA' [SAE PAPER 912010] p 843 A92-45410

MORRIS, A. J.

Fundamentals of structural optimisation p 851 N92-28470

MORRIS, ANDREW

The evaluation of simulator effectiveness for the training of high speed, low level, tactical flight operations p 885 N92-28539

MORRIS, MARTIN J.

Numerical simulation of a confined transonic normal shock wave/turbulent boundary layer interaction

IAIAA PAPER 92-36681 MOSES, CLIFFORD A.

High-temperature miniaturized turbine engine lubrication system simulator p 868 N92-28294

MOSS, J. N.

Aerothermodynamics of a 1.6-meter-diameter sphere in p 808 A92-45840 hypersonic rarefied flow

JAD-A2492591

MOSS, JAMES N. Hypersonic rarefied flow about a delta wing - direct

simulation and comparison with experiment p 812 A92-46892

MOUSTAPHA, S. H.

Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720

MUELLER, ALAN

Computations of hypersonic flows around a three-dimensional concave/convex body [AIAA PAPER 92-2606] p 805 A92-45570

MUELLER, T.

Construction of a real-time DGPS experimental system p 840 A92-47631

MUIR, HELEN

The effect on aircraft evacuations of behaviour and smoke in the cabin p 834 A92-44998

MUKHOPADHYAY, VIVEK

On-line performance evaluation of multiloop digital control systems p 873 A92-46739 MUNDT, CH.

Calculation of hypersonic, viscous, non-equilibrium flows around reentry bodies using a coupled boundary laver/Euler method

[AIAA PAPER 92-2856] p 819 A92-47839

MUNGUR, P.

A distributed vaporization time-lag model for gas turbine combustor dynamics [AIAA PAPER 92-3465] p 865 A92-49014

MUNSON, JOHN H.

Development of high performance compressor discharge seal p 907 A92-49096

MURAGISHI, OSAMU

Demonstration of gas liquid separation under the microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416

MURAIDA, DANIEL J.

Design specifications for the Advanced Instructional Design Advisor (AIDA), volume 2 p 923 N92-29188

JAD-A2482021 MURATA, SHIGERU

Numerical solutions of unsteady oscillating flows past

an airfoil | AIAA PAPER 92-3212 | p 825 A92-48817

MURMAN, SCOTT M.

Coupled numerical simulation of the external and engine

inlet flows for the F-18 at large incidence [AIAA PAPER 92-2621] p 793 A92-45493 Analysis of a pneumatic forebody flow control concept

about a full aircraft geometry I AIAA PAPER 92-2678] p 799 A92-45530

MUROTA, KATSUICHI

Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test [SAE PAPER 911979] p 872 A92-45384

MURPHY, CHARLES H.

Symptom of payload-induced flight instability

p 873 A92-46761

MURPHY, KEVIN J.

Operational noise data for OH-58D Army helicopters [AD-A246822] p 926 N92-28292

MURTHY, S. N. B.

High-speed flight propulsion systems [ISBN 1-56347-011-X] p p 862 A92-46426 Energy analysis of high-speed flight systems

p 925 A92-46430

MURTHY, V. R. Sensitivity analysis of discrete periodic systems with

applications to helicopter rotor dynamics p 846 A92-46884 Free vibration analysis of branched blades by the

integrating matrix method MUYLAERT, J. p 847 A92-47122

Aerothermodynamic calculations for the Space Shuttle Orbiter p 821 A92-47917

[AIAA PAPER 92-2953] MYERS, JERRY A.

VHDL design and simulation for airborne graphics generation requirements p 902 A92-48465 MYERS, LAWRENCE P.

Flight evaluation of an extended engine life mode on an F-15 airplane INASA-TM-1042401 p 871 N92-29659

MYHRE, GRETE

Mandatory psychological testing of pilots as a requirement for licensing in Norway? p 835 A92-45081

MYKITYSHYN, MARK G.

Electronic presentation of instrument approach formation p 855 A92-44923 information

N

NAGARAJA, K. S.

Low density heat transfer phenomena AIAA PAPER 92-2899 | p

p 820 A92-47875 NAGASHIMA, TETSUYA Shock interaction induced hν two

ISAE PAPER 9120431 p 790 A92-45427 NAGASHIMA, TOMOARI

Free wake analyses of a hovering rotor using panel method

[SAE PAPER 912004] p 789 A92-45405 Prediction of dynamic hub load of a rotor executing multiple sinusoidal blade pitch variations

p 846 A92-46921 NAKAGAWA, HIROYUKI

Free wake analyses of a hovering rotor using panel method ISAE PAPER 912004 p 789 A92-45405

NAKAGAWA. I. Combustion of solid fueled ramjet. I

| AIAA PAPER 92-3727 | p 894 A92-49105

NEWMAN, GARY

hypersonic aircraft
[AIAA PAPER 92-2722]

NEWMAN, JAMES C., JR.

aging commercial transport fleet

On the aerodynamics/dynamics of store separation from

Fracture mechanics research at NASA related to the

p 807 A92-45595

p 913 N92-30110

		, -
NAKAJIMA, YOSHIJI	NEWPORT, JOHN	NSI MBA, M.
Flow field around thick delta wing with rounded leading edge	A new development in embedded computer performance measurement p 921 A92-48506	Experimental and computational studies of hovering rotor flows p 815 A92-46954
SAE PAPER 912009 p 789 A92-45409	NG, T. T.	NYBERG, GREGORY
NAKAMURA, MASARU	Experimental study of vortex flows over delta wings in	Fighter airframe/propulsion integration - A McDonnell
A simulator study of a flight reference display for powered-lift STOL aircraft	wing-rock motion p 810 A92-46787	Aircraft perspective
	Forebody vortex control using small, rotatable strakes p 811 A92-46798	[AIAA PAPER 92-3333] p 850 A92-48916
NAKAMURA, TAKASHI	Effect of a nose-boom on forebody vortex flow	0
Finite elements analysis of flexural edge wave for	p 812 A92-46818	0
composite fan blades [SAE PAPER 912048] p 861 A92-45432	NGUYEN, BA T.	O'BRIMSKI, FRANCIS J.
NAKAMURA, YOSHIAKI	Analysis of the VISTA longitudinal simulation capability	An overview of US Navy and Marine Corps V/STOL
Flow field around thick delta wing with rounded leading	for a cruise flight condition p 876 A92-48488	p 783 A92-45303
edge	NGUYEN, H. L. Applied analytical combustion/emissions research at the	O'CONNOR, LEO Active magnetic bearings give systems a lift
[SAE PAPER 912009] p 789 A92-45409 Shock interaction induced by two	NASA Lewis Research Center	p 901 A92-48201
hemisphere-cylinders	[NASA-TM-105731] p 890 N92-29343	OBERKAMPF, WILLIAM L.
[SAE PAPER 912043] p 790 A92-45427	NICHOLAS, O. P.	Joint computational/experimental aerodynamics
NAKAO, MASAHIRO	A progress report on ASTOVL control concept studies under the VAAC programme p 871 A92-45319	research on a hypersonic vehicle. I - Experimental results p 812 A92-46890
Numerical simulations of hypersonic real-gas flows over space vehicles	Some longitudinal handling qualities design quidelines	Joint computational/experimental aerodynamics
[SAE PAPER 912045] p 791 A92-45429	for active control technology transport aircraft	research on hypersonic vehicle. II - Computational
NAKAO, YOSHIYUKI	[NLR-TP-90129-U] p 878 N92-28652	results p 812 A92-46891 OBERMAYER, M.
Flow field around thick delta wing with rounded leading edge	NICHOLAS, THEODORE	Experience with piloted simulation in the development
[SAE PAPER 912009] p 789 A92-45409	Elevated temperature crack growth in aircraft engine materials p 891 A92-45234	of helicopters p 884 N92-28528
NAMDAR, BAHMAN	NICHOLS, LYNNE	Experience with piloted simulation in the development
BUWICE - An interactive icing program applied to engine	Putting the control back in air traffic control - An	of helicopters [MBB-UD-0610-91-PUB] p 889 N92-30076
inlets [AIAA PAPER 92-3179] p 922 A92-48794	enhanced Universal Development Simulation System	OBRIEN, WALTER F.
NARAYANSWAMI, N.	p 916 A92-44982 NICHOLS, R. H.	Dynamic simulation of compressor and gas turbine
Interaction between crossing oblique shocks and a	Calculation of high speed base flows	performance p 869 N92-28463
turbulent boundary layer p 812 A92-46882	[AIAA PAPER 92-2679] p 799 A92-45531	OGAWA, TOSHIO Functional mock-up tests for flight control system of the
NARKIEWICZ, JANUSZ A new method of helicopter rotor blade motion control	NICOUT, D.	NAL QSTOL research aircraft 'ASKA'
p 875 A92-47786	New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels	[SAE PAPER 912036] p 881 A92-45422
NARRAMORE, J. C.	[ONERA, TP NO. 1992-39] p 882 A92-48600	OGBURN, MARILYN E.
Numerical simulation of multizone two-dimensional	NIGGEMANN, R. E.	Application of piloted simulation to high-angle-of-attack flight-dynamics research for fighter aircraft
transonic flows using the full Navier-Stokes equations p 815 A92-46955	270-Vdc/hybrid 115 Vac electric power generating system technology demonstrator	p 886 N92-28551
NAUGHTON, J. W.	[SAE PAPER 912051] p 861 A92-45435	OHNUKI, TAKESHI
Experiments on the enhancement of compressible	NIKSCH, RICHARD A.	Aero-structural integrated design of forward swept
mixing via streamwise vorticity. I - Optical measurements [AIAA PAPER 92-3549] p 906 A92-49064	ASTOVL flexibility in the 21st century	wing [SAE PAPER 912021] p 790 A92-45414
[AIAA PAPER 92-3549] p 906 A92-49064 NAYFEH, A. H.	p 783 A92-45309 NIRENBERG, ALLAN	OHTAKE, KUNIHIKO
Effect of a bulge on the subharmonic instability of	IsoDoppler and mocomp corrections improve MTI	An analysis of the effect of centrifugal force on the impact
subsonic boundary layers p 898 A92-45833	radar p 898 A92-45774	resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431
NEAL, DONALD M. A sensitivity analysis on component reliability from	NISHIO, SEIJI	Finite elements analysis of flexural edge wave for
fatigue life computations	Demonstration of gas liquid separation under the microgravity by aircraft KC-135	composite fan blades
[AD-A247430] p 908 N92-28425	[SAE PAPER 912024] p 897 A92-45416	[SAE PAPER 912048] p 861 A92-45432
NEESE, RICHARD E.	NISSLEY, WILLIAM	OJHA, SHIVA K. Optimization of constant altitude-constant airspeed flight
Partitioned software support concept for modular embedded computer software p 922 A92-48518	Drop test: Cessna Golden Eagle 421B [DOT/FAA/CT-TN91/32] p 837 N92-28900	of turbojet aircraft p 845 A92-46815
NEINER, GEORGE H.	NITTA, KYOKO	OK, HONAM
Hot gas ingestion characteristics and flow visualization	Analysis of motion of airfoil flying over wavy-wall surface	BUWICE - An interactive icing program applied to engine
of a vectored thrust STOVL concept p 860 A92-45316	(lifting surface method) p 818 A92-47100	inlets [AIAA PAPER 92-3179] p 922 A92-48794
NEJAD. A. S.	NITZSCHE, F. Whirl-flutter stability of a pusher configuration in	OKADA, NORIAKI
Swirl number effects on confined flows in a model of	nonuniform flow p 845 A92-46813	Functional mock-up tests for flight control system of the
a dump combustor p 896 A92-45202	NIWA, SHOHEI	NAL QSTOL research aircraft 'ASKA' [SAE PAPER 912036] p 881 A92-45422
NEKOHASHI, TOSHIFUMI Prediction of dynamic hub load of a rotor executing	Ducted fan VTOL for working platform [SAE PAPER 911995] p 843 A92-45397	OKAMOTO, OSAMU
multiple sinusoidal blade pitch variations	A design of strongly stabilizing controller	Quaternion and Euler angles in kinematics
p 846 A92-46921	[SAE PAPER 912081] p 917 A92-45456	[NAL-TM-636] p 909 N92-28836
NELSON, C. P.	NIXON, DAVID	OKAZAWA, SHIN A design of strongly stabilizing controller
Effects of wing planform on HSCT off-design	Outflow boundary conditions using Duhamel's	[SAE PAPER 912081] p 917 A92-45456
aerodynamics [AIAA PAPER 92-2629] p 844 A92-45501	equation p 813 A92-46913 NOBACK, R.	OKUMURA, HIDEHITO
NELSON, CHRIS	Response of helicopters to gusts	An analysis of the effect of centrifugal force on the impact
A fast, uncoupled, compressible, two-dimensional,	[NLR-TP-90159-U] p 879 N92-28653	resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431
unsteady boundary layer algorithm with separation for	Atmospheric turbulence spectra and correlation functions	Finite elements analysis of flexural edge wave for
engine inlets [AIAA PAPER 92-3082] p 823 A92-48729	[NLR-TP-89217-U] p 915 N92-28689	composite fan blades
NETZER, ALLAN	NONAKA, OSAMU	[SAE PAPER 912048] p 861 A92-45432
Airborne Data Acquisition and Relay System	Spaceplane longitudinal aerodynamic parameter	OKUYAMA, MASAHIRO Wind tunnel investigation of an improved upper surface
p 839 A92-47574	estimation by cable-mount dynamic wind-tunnel test [SAE PAPER 911980] p 788 A92-45385	blown flap transport semi-span model
NETZER, DAVID W. A study of the flammability limit of the backward facing	NOOR, AHMED K.	[SAE PAPER 911993] p 789 A92-45395
step flow combustion	Sensitivity of tire response to variations in material and	OLMOS, M. Hypersonic plasma predictions at nonzero angle of
[AIAA PAPER 92-3846] p 895 A92-49136	geometric parameters p 900 A92-47128 NORTH, DAVID M.	attack
NEUMEIER, MARK E.	A340 handling, cockpit design improve on predecessor	[AIAA PAPER 92-3027] p 925 A92-47028
Mode S data link pilot-system interface - A blessing in	A320 p 849 A92-47969	OLSON, JAMES R.
de skies or a beast of burden? p 839 A92-44920 NEWBERRY, CONRAD F.	NORTON, R. J. G.	Fabrication and mechanical properties of an optically transparent glass fiber/polymer matrix composite
Applied aerodynamics education - Design and science	Prediction of a high bypass ratio engine exhaust nozzle flowfield	p 891 A92-45630
[AIAA PAPER 92-2662] p 928 A92-45581	[AIAA PAPER 92-3259] p 864 A92-48855	OLSON, LARRY E.

Ablation performance characterization of thermal protection materials using a Mach 4.4 Sled Test
[AIAA PAPER 92-3055] p 893 A92-48713
Aerothermal ablation behavior of selected candidate external insulation materials

p 893 A92-48714

[AIAA PAPER 92-3056]

p 927 N92-28909

The design of test-section inserts for higher speed

aeroacoustic testing in the Ames 80- by 120-foot wind

Passive acoustic range estimation of helicopters
[AD-A248033] p 926 N92-28302

tunnel

OLSON, REO

[NASA-TM-103915]

OLWI, I. A.
Aircraft spoiler effects under wind shear
[AIAA PAPER 92-2642] p 79
ONDA, MASAHIKO

An acrobatic airship 'Acrostat'
[SAE PAPER 911994]

Flow quality studies of the NASA Lewis Research Center

8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel

PICKETT, MARK T.

[NASA-TM-105417]

[SAE PAPER 911994] p 843 A92-45396	Experimental development of spanwise vortex models	PIERCE, ALLAN D.
High-altitude lighter-than-air powered platform	with streamwise decay due to wall interaction [AIAA PAPER 92-2688] p 799 A92-45535	The effect of molecular relaxation processes in air on
[SAE PAPER 912054] p 844 A92-45438	PEACE, A. J.	the rise time of sonic booms p 898 A92-45883 PIERS, M. A.
ONUSTACK, STEVEN A. The large scale test control systems designed and built	The construction, application and interpretation of	Application of knowledge-based systems for diagnosis
by the Boeing Company to support the 757 and 767 major	three-dimensional hybrid meshes p 919 A92-47089	of aircraft systems
fatigue tests	PEAL, RICHARD A. Avionics flight systems for the 21st century	[NLR-TP-90192-U] p 837 N92-28655
[SAE PAPER 911985] p 881 A92-45388	SAE PAPER 912033 p 784 A92-45421	PIMM, JOHN H.
OOKAMI, YOSHIAKI Quaternion and Euler angles in kinematics	PEARSON, ALLAN E.	Design and test of aircraft aft fuselage structure using postbuckled shear panels p 848 A92-47406
[NAL-TM-636] p 909 N92-28836	Parameter identification for nonlinear aerodynamic	PINCKNEY, FRANK D.
ORME, JOHN S.	systems [NASA-CR-190264] p 830 N92-29329	Magnetic bearing design and control optimization for a
Subsonic flight test evaluation of a performance seeking	PEDRO, JIMOH	four-stage centrifugal compressor p 900 A92-47188
control algorithm on an F-15 airplane	Mathematical modeling of the effect of windshear on	PINE, NICHOLSON L.
[AIAA PAPER 92-3743] p 878 A92-49109 Subsonic flight test evaluation of a propulsion system	the dynamics of a landing aircraft p 875 A92-47784	Fiber-optic pressure sensor system for gas turbine engine control p 857 A92-48047
parameter estimation process for the F100 engine	PEECHER, S. 270-Vdc/hybrid 115 Vac electric power generating	PINNEY, MARK
[AIAA PAPER 92-3745] p 866 A92-49110	system technology demonstrator	On the aerodynamics/dynamics of store separation from
OSER, RANDALL L.	[SAE PAPER 912051] p 861 A92-45435	hypersonic aircraft
An analysis of aircrew communication patterns and content	PELUSO, JAMES D. Turboshaft/turboprop cycle sensitivity analysis	[AIAA PAPER 92-2722] p 807 A92-45595 PIPERIAS, P.
[AD-A246618] p 907 N92-28253	[AIAA PAPER 92-3476] p 865 A92-49020	Reduction and analysis of F-111C flight data
OSHIMA, H.	PEREZ, EMILIO	[AD-A250341] p 853 N92-28771
Measurements of the velocity and vorticity fields around	Optimum cruise lift coefficient in initial design of jet	PITARYS, MARC J.
a pitching airfoil [AIAA PAPER 92-2626] p 794 A92-45498	aircraft p 845 A92-46806 PEREZ, GREGORY, JR.	Avionics software reusability observations and
OSTER, REINHOLD	An eight month gearbox development program	recommendations p 921 A92-48502 Partitioned software support concept for modular
Computed Tomography (CT) as a nondestructive test	[AIAA PAPER 92-3368] p 850 A92-48941	embedded computer software p 922 A92-48518
method used for composite helicopter components	PERKINS, JOHN N.	PLATT, J. T.
[MBB-UD-0603-91-PUB] p 910 N92-29873	Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression	Evolution of ASTOVL aircraft design
OVERSTREET, MARK A. Fiber optic speed sensor for advanced gas turbine	scramjet inlets	p 842 A92-45311
engine control p 857 A92-48044	[AIAA PAPER 92-3099] p 824 A92-48741	PLATZER, MAX F. Pitch rate/sideslip effects on leading-edge extension
OWEN, STEPHEN J.	PERSCHBACHER, DAVID L. An explanation-based-learning approach to knowledge	vortices of an F/A-18 aircraft model
Navier-Stokes and Euler solutions for an unmanned	compilation - A Pilot's Associate application	p 874 A92-46810
aerial vehicle [AIAA PAPER 92-2609] p 792 A92-45483	p 920 A92-48220	POESTKOKE, R.
OZGUR, DINCER	The importance of implicit and explicit knowledge in a	Instrumentation requirements for laminar flow research in the NLR high speed wind tunnel HST
Gas turbine exhaust system silencing design	pitot's associate system p 858 A92-48567 PERUCCHINI, J.	(NLR-TP-89158-U) p 887 N92-28669
p 882 A92-47365	Indirect measurements of convective flow by IR	POLACSEK, C.
n	thermography	Basic experiments on the directivity of the sound
P	[ONERA, TP NO. 1992-46] p 902 A92-48607 PETERS, DAVID A.	radiation emitted by a turboshaft engine [ONERA, TP NO. 1992-36] p 926 A92-48597
		Influence of geometrical parameters on helicopter rotor
PADUANO J	Penodic trin solutions with rip-version limite elements	
PADUANO, J. Dynamic control of aerodynamic instabilities in gas	Periodic trim solutions with hp-version finite elements in time p 874 A92-46931	high speed impulsive noise
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J.	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932	high speed impulsive noise [ONERA TP NO. 1992-40] p 926 A92-48601 POPPE, M.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J.	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M.	high speed impulsive noise [ONERA TP NO. 1992-40] p 926 A92-48601 POPPE, M.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47831 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, UEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J.	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C.	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M.	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF PETROV, M. Experimental investigation of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J.	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [INASA-TM-105675] p 833 N92-30182 PAO, S. P.	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J.	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAD, J. V. R. Active control of blade vortex interaction
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J.	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airtoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airtoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAD, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-46986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-46986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFIZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILIPPE, JEAN-JACQUES Research on helicopter rotors Progress in	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital Pl controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related of the control of the performance p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-46986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILIPPE, JEAN-JACQUES Research on helicopter rotors - Progress in aerodynamics, aeroelasticity and acoustics	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [IAIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L.
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airtrame structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] PHILIPPE, JEAN-JACQUES Research on helicopter rotors Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47831 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital Pl controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-46986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILIPPE, JEAN-JACQUES Research on helicopter rotors - Progress in aerodynamics, aeroelasticity and acoustics	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAD, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] PHILIPPE, JEAN-JACQUES Research on helicopter rotors Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589 PHILLIPS, H. I. Harrier international programme p 841 A92-45305	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital Pl controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [NASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement sensor p 857 A92-48046	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-46986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILLIPPE, JEAN-JACQUES Research on helicopter rotors - Progress in aerodynamics, aeroelasticity and acoustics IONERA, TP NO. 1992-271 p 849 A92-48595 PHILLIPS, H. I. Harrier international programme p 841 A92-48505	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 PRIEUR, J. Influence of geometrical parameters on helicopter rotor
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement sensor p 857 A92-48046	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILLIPPE, JEAN-JACQUES Research on helicopter rotors Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589 PHILLIPS, H. I. Harrier international programme p 841 A92-45305 PHILLPOT, M. G. Practical considerations in designing the engine cycle	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 PRIEUR, J. Influence of geometrical parameters on helicopter rotor high speed impulsive noise
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement sensor p 857 A92-48046 PATUREAU, PHILLIPPE Real time presentation for RAFALE in-flight tests p 882 A92-47522	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILIPPE, JEAN-JACQUES Research on helicopter rotors - Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589 PHILIPS, H. I. Harrier international programme p 841 A92-45305 PHILIPS, M. I. Practical considerations in designing the engine cycle p 869 N92-28460	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAO, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 PRIEUR, J. Influence of geometrical parameters on helicopter rotor
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil [INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement sensor p 857 A92-48046 PATUREAU, PHILLIPPE Real time presentation for RAFALE in-flight tests p 882 A92-47522	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILLIPPE, JEAN-JACQUES Research on helicopter rotors Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589 PHILLIPS, H. I. Harrier international programme p 841 A92-45305 PHILLIPS, H. I. Harrier international programme p 841 A92-45305 PHILLIPS, H. I. Areduced by a reduced boeing 727-100QF center inlet S-duct by a reduced	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47831 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital PI controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAD, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASAMTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 PRIEUR, J. Influence of geometrical parameters on helicopter rotor high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 PRINCE, CAROLYN An analysis of aircrew communication patterns and
Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 PAGE, G. J. Prediction and measurement of jet flowfield features for ASTOVL aircraft p 787 A92-45318 PAGNIEZ, PIERRE The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544 PANARAS, ARGYRIS G. Numerical study of secondary separation in glancing shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087 PANDA, J. Experimental investigation of the flowfield of an oscillating airfoil [AIAA PAPER 92-2622] p 793 A92-45494 Experimental investigation of the flowfield of an oscillating airfoil INASA-TM-105675] p 833 N92-30182 PAO, S. P. Grid adaptation to multiple functions for applied aerodynamic analysis p 817 A92-47045 PAOLETTI, STEFANO An unfactored implicit scheme for 3D inviscid transonic flows [AIAA PAPER 92-2668] p 798 A92-45523 PARK, KIHONG Thrust laws for microburst wind shear penetration p 873 A92-46750 PARNAS, LEVEND Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 899 A92-46940 PASSALACQUA, M. Viscous high-speed flow computations by adaptive mesh embedding techniques p 808 A92-45839 PATRIQUIN, DOUGLAS R. Wavelength encoded fiber optic angular displacement sensor p 857 A92-48046 PATUREAU, PHILLIPPE Real time presentation for RAFALE in-flight tests p 882 A92-47522	in time p 874 A92-46931 An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Aerodynamic parametric studies and sensitivity analysis for rotor blades in axial flight p 816 A92-46959 PETERS, JEANNE M. Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128 PETERSON, J. B., JR. On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in the NTF p 880 A92-45265 PETIAU, C. Structural optimization of aircraft p 851 N92-28472 PETROV, M. Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429] p 894 A92-48986 PEYRAN, R. J. The effect of composite material allowable changes on VTOL airframe weights p 848 A92-47629 PFAFFENBERGER, EUGENE E. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 PFANNESCHLAG, LISA J. An overview of US Navy and Marine Corps V/STOL p 783 A92-45303 PFITZNER, M. Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858 PHILIPPE, JEAN-JACQUES Research on helicopter rotors - Progress in aerodynamics, aeroelasticity and acoustics [ONERA, TP NO. 1992-27] p 849 A92-48589 PHILIPS, H. I. Harrier international programme p 841 A92-45305 PHILIPS, M. I. Practical considerations in designing the engine cycle p 869 N92-28460	high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 POPPE, M. Construction of a real-time DGPS experimental system p 840 A92-47631 POPPEL, GARY L. Fiber optic controls for aircraft engines - Issues and implications p 856 A92-46244 POPPEN, WILLIAM A. Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 PORTER, B. Robustness characteristics of fast-sampling digital Pl controllers for high-performance aircraft with impaired control surfaces p 877 A92-48496 POT, T. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 POTOTZKY, ANTHONY On-line performance evaluation of multiloop digital control systems p 873 A92-46739 PRASAD, J. V. R. Active control of blade vortex interaction p 814 A92-46944 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 PRASANTH, RAVI K. Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks [AIAA PAPER 92-3328] p 865 A92-48911 PRETZER, F. L. Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242 PRIEUR, J. Influence of geometrical parameters on helicopter rotor high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 PRINCE, CAROLYN

PAUL, W.

PAULEY, WAYNE R.

p 796 A92-45509

Application of the Euler method EUFLEX to a fighter-type

p 845 A92-45573

airplane configuration at transonic speed [AIAA PAPER 92-2620] p 8

RAMAPRIAN, B. R. REINHART, EUGENE R. PRINZ, U. Numerical simulation of chemical and thermal Measurements of the velocity and vorticity fields around Surface residual stress analysis of metals and alloys nonequilibrium flows behind compression shocks [AD-A248372] a pitching airfoil p 895 N92-28426 RENEAUX, J. p 820 A92-47860 p 794 A92-45498 [AIAA PAPER 92-2879] I AJAA PAPER 92-26261 PSIAKI, MARK L. LDV measurements in the three-dimensional near wake The design and testing of an airfoil with hybrid laminar Thrust laws for microburst wind shear penetration flow control of a stationary and oscillating rectangular wind
[AIAA PAPER 92-2689] p 799 A [ONERA, TP NO. 1992-22] p 873 A92-46750 p 799 A92-45536 p 822 A92-48585 PUTT, JAMES C. RESTER, AUSTIN RAMPERSAD, KRISHNA Advanced pneumatic impulse ice protection system Restart of theory of air-breathing engines Magnetic particle testing of turbine blades mounted on p 906 A92-49018 p 845 A92-46807 [AIAA PAPER 92-3472] p 898 A92-46498 the turbine rotor shaft REUTHER, J. RAMULU, M. design optimization of wing/body Q Tear straps in airplane fuselage configurations using the Euler equations [AIAA PAPER 92-2633] p [AD-A248543] p 854 N92-29511 p 795 A92-45505 RANOUX, GILBERT QIU, X. Y. REYNOLDS, MICHAEL C. Patch-independent structured multiblock grids for CFD A new vane swirler as applied to dual-inlet side-dump Mode S data link pilot-system interface - A blessing in computations p 919 A92-47078 combustor de skies or a beast of burden? p 839 A92-44920 [AIAA PAPER 92-3654] p 906 A92-49085 RAO, DHANVADA M. REYNOLDS, R. A. QUACKENBUSH, TODD R. A LEX blowing technique for post-stall lateral control Ablation performance characterization of thermal of trapezoidal wings A fast three-dimensional vortex method for unsteady protection materials using a Mach 4.4 Sled Test [AIAA PAPER 92-2714] p 802 A92-45553 wake calculations [AIAA PAPER 92-3055] p 893 A92-48713 | AIAA PAPER 92-2624 | p 794 A92-45496 Exploratory investigation of a spanwise blowing concept Aerothermal ablation behavior of selected candidate for tip-stall control on cranked-arrow wings Efficient high-resolution rotor wake calculations using external insulation materials p 814 A92-46951 p 806 A92-45576 flow field reconstruction [AIAA PAPER 92-2637] AIAA PAPER 92-3056) p 893 A92-48714 QUAGLIAROLI, T. M. REYNOLDS, THOMAS L.
Aircraft Command in Emergency Situations (ACES) RAO K V KrF laser-induced OH fluorescence imaging in a Vane-blade interaction in a transonic turbine. I supersonic combustion tunnel [SAE PAPER 912039] Aerodynamics p 835 A92-45424 p 905 A92-48923 [AIAA PAPER 92-3346] [AIAA PAPER 92-3323] p 825 A92-48906 RHOADES M. M. QUAGLIOTTI, F. B. Flight deck aerodynamics of a nonaviation ship Vane-blade interaction in a transonic turbine. II - Heat Experimental investigation of vortex dynamics on delta p 810 A92-46790 transfer wings [AIAA PAPER 92-3324] p 904 A92-48907 RHODES, JAMES A. [AIAA PAPER 92-2731] p 804 A92-45565 Internal reversing flow in a tailpipe offtake configuration RAPUC. M. QUAST, A. for SSTOVL aircraft Acquisition of an aerothermodynamic data base by The A320 laminar fin programme means of a winged experimental reentry vehicle INASA-TM-1056981 p 868 N92-28418 IONERA, TP NO. 1992-23] p 849 A92-48586 RIBEIRO, RENATO S. p 787 N92-30232 [MBB/FE202/S/PUB/461] QUELLMANN, WILFRIED Vortex-in-cell analysis of wing wake roll-up RASHIDI, MAJID Use of a virtual cockpit for the development of a future [AIAA PAPER 92-2703] p 801 A92-45545 Dynamics of a split torque helicopter transmission transport aircraft p 886 N92-28547 RICCIO, GARY E. [NASA-TM-105681] p 910 N92-29136 QUENTMEYER, RICHARD J. Toward an integrated multimodal approach to flight RAVI, R. An experimental investigation of high-aspect-ratio p 880 A92-45026 Compensating for manufacturing and life-cycle simulation cooling passages
[AIAA PAPER 92-3154] RICE, EDWARD J. variations in aircraft engine control systems p 890 A92-48780 The flip flop nozzle extended to supersonic flows [AIAA PAPER 92-2724] p 803 A92-4 [AIAA PAPER 92-3869] p 868 A92-49139 QUERIN, OSVALDO M. p 803 A92-45561 RAY, ROBERT Flow visualisation of a small diameter rotor operating RICE, RICHARD C. On the aerodynamics/dynamics of store separation from at high rotational speeds with blades at small pitch hypersonic aircraft Generation of spectra and stress histories for fatigue p 814 A92-46949 AIAA PAPER 92-2722] p 807 A92-45595 and damage tolerance analysis of fuselage repairs
[AD-A250390] p 854 N92-29180 QUINN, B. J. RAY, RONALD J. ASTOVL engine control p 860 A92-45321 Effects of bleed air extraction on thrust levels on the RICHARDSON, PAMELA F. Computational aerodynamics - The next generation F404-GE-400 turbofan engine [SAE PAPER 911988] p 788 A92-45390 INASA-TM-1042471 p 871 N92-29425 RICHTER, A. BRUCE Turbine aircraft engine operational trending and JT8D The optimization of variable cross-section spines with RACHELE, HENRY static component reliability study temperature dependent thermal parameters Assessment of one-dimensional icing forecast model applied to stratiform clouds p 915 A92-46803 p 901 A92-48353 [DOT/FAA/CT-91/10] p 870 N92-28686 RICHTER, R. REARDON, J. RADEMAKER, E. R. Mesh adaption for 2D transsonic Euler flows on The optimization of variable cross-section spines with Experimental validation of a line-duct acoustics model unstructured meshes p 816 A92-47038 temperature dependent thermal parameters including flow RIDENOUR-BENDER, MARGARET p 901 A92-48353 [NLR-TP-90223-U] p 927 N92-28695 Turbine aircraft engine operational trending and JT8D RAGHUNATHAN, S. Space Shuttle Orbiter auxiliary power unit status static component reliability study Effect of model cooling on periodic transonic flow p 889 A92-45442 [DOT/FAA/CT-91/10] p 870 N92-28686 [SAE PAPER 912060] p 813 A92-46900 RIÈCHERS, JOHN T. RÈDA, DANIEL C. A methodology for the evaluation of runway roughness RAJ. P. Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] Computational aerodynamics in aircraft design for repair [AD-A250407] Challenges and opportunities for Euler/Navier-Stokes p 887 N92-28772 p 911 N92-29954 REDEKER. G. RIEDELBAUCH, S. (SAE PAPER 911990) p 788 A92-45392 Hypersonic flow past radiation-cooled surfaces Concepts for the stability analysis of NLF-experiments [MBB-FE-202-S-PUB-0468-A] p 832 N92-29713 RAJAGOPALAN, R. G. on swept wings A unified procedure for solving rotor flowfield, [AIAA PAPER 92-2706] p 801 A92-45548 RIGGINS, D. W. p 814 A92-46950 A comparative study of scramjet injection strategies for performance and interference RÉDOLFI, J. p 859 N92-28377 What is an ASIC? high Mach numbers flows RALLO, R. REED, L. H. K. [AIAA PAPER 92-3287] p 904 A92-48876 An investigation of passive control methods for Recent developments at the Shoeburyness STOVL test shock-induced separation at hypersonic speeds Simulation of transonic flow over twin-jet transport [AIAA PAPER 92-2725] p 808 A92-45596 facility p 881 A92-45314 RAMACHANDRAN, K. aircraft p 811 A92-46793 Absolute fiber optic pressure transducer for aircraft air RINGENBACH, DANIEL P. Experimental and computational studies of hovering p 815 A92-46954 data measurement p 858 A92-48501 Use of simulation in the USAF Test Pilot School rotor flows REEDER, M. F. p 884 N92-28535 RAMAKRISHNAN, R. curriculum Supersonic jet mixing enhancement by 'delta-tabs' [AIAA PAPER 92-3548] p 826 A92-49063 Numerical simulation of aerothermal loads in hypersonic engine inlets due to shock impingement Prediction of gas turbine combustor flow by a finite p 792 A92-45482 [AIAA PAPER 92-2605] element code Current and future developments in civil aircraft Mixing and combustion effects in a sliding-wedge ram [AIAA PAPER 92-3469] p 906 A92-49016 non-destructive evaluation from an operator's point of accelerator with hydrogen injection RISTORI, A. p 787 N92-30122 [AIAA PAPER 92-3251] p 890 A92-48849 Indirect measurements of convective flow by IR REICHERT, BRUCE A. RAMAKRISHNAN, S. V. thermography Navier-Stokes analysis and experimental [ONERA, TP NO. 1992-46] Scale effects on the flow past the mated Space Shuttle p 902 A92-48607 comparison of compressible flow in a diffusing S-duct RIZK, YEHIA M. configuration p 800 A92-45541 [AIAA PAPER 92-2699] [AIAA PAPER 92-2680] p 799 A92-45532 Coupled numerical simulation of the external and engine REID. L. D. inlet flows for the F-18 at large incidence RAMAN, GANESH An evaluation of IFR approach techniques: Generic [AIAA PAPER 92-2621] p 793 A92-45493 The flip flop nozzle extended to supersonic flows helicopter simulation compared with actual flight [AIAA PAPER 92-2724] p 803 A92-45561 Numerical investigation of tail buffet on F-18 aircraft p 886 N92-28550

REID, MAX B.

[NASA-TM-103902]

Binary optical filters for scale invariant pattern

p 853 N92-28910

RAMAPRAIN, B. R.

IAD-A2475321

unsteady flow over an airfoil

Study of the leading-edge vortex dynamics in the

p 829 N92-28865

p 798 A92-45528

p 799 A92-45530

[AIAA PAPER 92-2673]

[AIAA PAPER 92-2678]

about a full aircraft geometry

Analysis of a pneumatic forebody flow control concept

ROACH, ROBERT L. PERSONAL AUTHOR INDEX Investigations of propulsion integration interference

SAITO, Y.

Navier-Stokes predictions for the F-18 wing and fuselage

p 810 A92-46783 at large incidence effects on a transport aircraft configuration Conceptual study of separated core ultra high bypass p 849 A92-48739 [AIAA PAPER 92-3097] ROACH, ROBERT L. [AIAA PAPER 92-3775] ROTH, PAUL A fast, uncoupled, compressible, two-dimensional, p 867 A92-49119 Double Density recording acquisition and playback SAITO, YOSHIO unsteady boundary layer algorithm with separation for p 920 A92-47534 Design and off-design point characteristics of Separated engine inlets ROTZ, CHRISTOPHER A. I AIAA PAPER 92-30821 p 823 A92-48729 Core Ultra High Bypass Engine (SCUBE) Filament winding of composite isogrid fuselage 1AIAA PAPER 92-3776] p 867 A92-49120 ROARK, CHUCK p 784 A92-47405 structures A new development in embedded computer SAKA, MITSUO erformance measurement p 921 A92-48506 ROUSE, WILLIAM B. On the possibility of freezing and sticking phenomena ROBERT, J. P. Specification of adaptive aiding systems - Information in a transport during the ground taxiing and takeoff run requirements for designers p 916 A92-44915 The A320 laminar fin programme and on the preventions of the hazard [SAE PAPER 912042] ONERA, TP NO. 1992-23] p 849 A92-48586 ROWLES, STEVE H. p 836 A92-45426 Second-order shock-expansion theory extended to ROBERTS, DONALD W. SAKAGUCHI, HAJIME include real gas effects Numerical simulations of the transdetonative ram Air ejector experiments using the two-dimensional p 831 N92-29539 IAD-A2471911 accelerator combusting flow field on a parallel computer supersonic cascade tunnel: Zero secondary flow p 894 A92-48848 ROYSTON, JAMES D. [AIAA PAPER 92-3249] performance ROBERTS, LEONARD Superconducting bearings with levitation control p 887 N92-28829 Navier-Stokes computation of wing leading edge configurations SAKAI, KENJI [NASA-CASE-GSC-13346-1] p 909 N92-29099 tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p.8 Aerodynamic development of boundary layer control ROZENDAL, D. p 805 A92-45568 system for NAL OSTOL research aircraft 'ASKA' Instrumentation requirements for laminar flow research ROBINSON, O. [SAE PAPER 912010] p 843 A92-45410 in the NLR high speed wind tunnel HST Unsteady crossflow on a delta wing using particle image SAKAI, TETSU INLR-TP-89158-U1 p 887 N92-28669 p 811 A92 46804 velocimetry Analysis of motion of airfoil flying over wavy-wall surface ROZMAN, G. ROBINSON, STEPHEN K. p 818 A92-47100 270-Vdc/hybrid 115 Vac electric power generating (lifting surface method) Separation control on high Reynolds number multi-element airfoils system technology demonstrator SAKAMOTO, ATSUHIRO [AIAA PAPER 92-2636] p 861 A92-45435 Numerical simulations of separated flows around [SAE PAPER 912051] p 806 A92-45575 oscillating airfoil for dynamic stall phenomena RUBBERT, PAUL E. ROCK, STACEY G. p 788 A92-45393 The impact of CFD on the airplane design process -[SAE PAPER 911991] Analysis of thermo-chemical nonequilibrium models for Today and tomorrow [SAE PAPER 911989] SAKELLARIOU, N. carbon dioxide flows p 788 A92-45391 Prediction and measurement of jet flowfield features for [AIAA PAPER 92-2852] p 892 A92-47835 RUDAKOV, A. S. ASTOVL aircraft p 787 A92-45318 ROCKWELL, D. Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A Unsteady crossflow on a delta wing using particle image SAKOWSKI, BARBARA p 891 A92-45451 A fast, uncoupled, compressible, two-dimensional, velocimetry p 811 A92-46804 RODDEN, WILLIAM P. RUDALEVIGE, TREVOR unsteady boundary layer algorithm with separation for A sensitivity analysis on component reliability from Comment on 'Canard-wing interaction in unsteady supersonic flow p 812 A92-46820 fatigue life computations [AIAA PAPER 92-3082] p 823 A92-48729 A2474301 p 908 N92-28425 RODGER, P. Interface of an uncoupled boundary layer algorithm with Establishing two-dimensional flow in a large-scale planar RUDD, ROBERT E., III an inviscid core flow algorithm for unsteady supersonic turbine cascade Wavelength encoded fiber optic angular displacement engine intets [AIAA PAPER 92-3066] p 823 A92-48720 p 857 A92-48046 [AIAA PAPER 92-3083] p 823 A92-48730 RUSAK, Z. RODGERS, COLIN SAMAK, D. K. The subsonic and transonic flow around the leading edge Auxiliary power units for current and future aircraft [SAE PAPER 912059] p 862 A92-45 A study of rotor wake development and wake/body of a thin airfoil with a parabolic nose p 862 A92-45441 interactions in hover p 813 A92-46935 p 797 A92-45516 [AIAA PAPER 92-2649] RODRIGUES, E. A. SAMAREH-ABOLHASSANI, JAMSHID RUSAKOV, V. V. Whirl-flutter stability of a pusher configuration in Surface grid generation in a parameter space [AIAA PAPER 92-2717] p 803 A p 845 A92-46813 Similarity relations for calculating three-dimensional nonuniform flow p 803 A92-45556 chemically nonequilibrium viscous flows SAMBAMURTHI, JAY p 827 A92-49188 p 880 A92-45096 The DAM vertical shock-tube Laminar hypersonic flow over a compression using the ROESLER, TIMOTHY C. RUSSELL, G. W. HANA code Analytical design and demonstration of a low-cost Ablation performance characterization of thermal [AIAA PAPER 92-2896] protection materials using a Mach 4.4 Sled Test n 820 A92-47872 expendable turbine engine combustor [AIAA PAPER 92-3754] SAMIMY, M. [AIAA PAPER 92-3055] p 893 A92-48713 Aerothermal ablation behavior of selected candidate p 867 A92-49112 Supersonic jet mixing enhancement by 'delta-tabs' ROGERS, R. C. external insulation materials [AIAA PAPER 92-3548] p 826 A92-49063 A comparative study of scramjet injection strategies for IAIAA PAPER 92-3056] p 893 A92-48714 SAMPATH, SAM N. high Mach numbers flows RUSSELL MARK S. Current DOT research on the effect of multiple site AIAA PAPER 92-3287] p 904 A92-48876 damage on structural integrity A high performance general purpose processing element p 913 N92-30112 ROGERS, W. L. p 920 A92-48440 for avionic applications X-29 H-infinity controller synthesis SAMUELSEN, G. S. BUTLEDGE, WALTER H. p 873 A92-46749 Mixing in the dome region of a staged gas turbine Grid sensitivity in low Reynolds number hypersonic ROHLING, H. combustor p 817 A92-47057 Construction of a real-time DGPS experimental system continuum flows [AIAA PAPER 92-3089] p 903 A92-48734 p 840 A92-47631 Effect of the grid system on heat transfer computations The influence of spray angle on the continuous- and ROHNE, P. B. for high speed flows p 900 A92-47071 discrete-phase flowfield downstream of an engine Instrumentation requirements for laminar flow research RUZICKA, G. C. combustor swirl cup in the NLR high speed wind tunnel HST [AIAA PAPER 92-3231] A general purpose nonlinear rigid body mass finite p 863 A92-48832 p 887 N92-28669 [NLR-TP-89158-U] element for application to rotary wing dynamics SANKAR, L. N. RÔLADER, G. E. p 846 A92-46924 Numerical simulation of multizone two-dimensional Progress towards the development of transient ram transonic flows using the full Navier-Stokes equations accelerator simulation as part of the U.S. Air Force Ignition delays, heats of combustion, and reaction rates p 815 A92-46955 Armament Directorate Research Program of aluminum alkyl derivatives used as ignition and Effects of leading and trailing edge flaps on the p 904 A92-48847 [AIAA PAPER 92-3248] combustion enhancers for supersonic combustors aerodynamics of airfoil/vortex interactions RÓM, JOSEF [AIAA PAPER 92-3841] p 894 A92-49134 p 815 A92-46957 The External Propulsion Accelerator - Scramjet thrust SARAVANAMUTTOO, H. I. H. without interaction with accelerator barrel [AIAA PAPER 92-3717] p 86 Overview on basis and use of performance prediction p 866 A92-49098 S p 869 N92-28459 RONZHEIMER, A. Component performance requirements Multi-block arid generation p 869 N92-28462 wing-body-engine-pylon configurations The role of systems simulation for the development and SASA, SHUICHI p 817 A92-47060 qualification of ATTAS Spaceplane longitudinal aerodynamic parameter ROSE, DAVE SABA, COSTANDY S. estimation by cable-mount dynamic wind-tunnel test Scenario analysis of thigh gap related ejection injuries Lubricant evaluation and performance 2 p 788 A92-45385 p 834 A92-44995 [SAE PAPER 911980] p 895 N92-28398 IAD-A2474641 SASTRY, SHANKAR ROSS, JAMES C. SACHS, GOTTFRIED Computational evaluation of an airfoil with a Gurnev Nonlinear control design for slightly nonminimum phase Thrust/speed effects on long-term dynamics of systems - Application to V/STOL aircraft p 889 A92-46766 aerospace planes p 876 A92-48160 1AIAA PAPER 92-27081 p 802 A92-45550 SADDOUGHI, SEYED G. SATERLIE, S. F. ROSSITTO, K. F. A preliminary experimental investigation of local isotropy The use and effectiveness of piloted simulation in Hypersonic plasma predictions at nonzero angle of in high-Reynolds-number turbulence transport aircraft research and development attack p 912 N92-30042 p 886 N92-28549 [AIAA PAPER 92-3027] p 925 A92-47028 ROSSOW, C.-C. SAID, WALEED SATO, SHIGERU An artificial intelligence approach for the verification of Multi-block arid generation Experimental | validation scramjet nozzle around wing-body-engine-pylon configurations requirements for aircraft electrical power systems performance p 817 A92-47060 p 863 A92-48481 [AIAA PAPER 92-3290] p 864 A92-48879

SATO, TAKASHI Free wake analyses of a hovering rotor using panel p 789 A92-45405 ISAE PAPER 912004] SATO, TATSUO Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material p 843 A92-45437 ISAE PAPER 9120531 SAUCEDO, V. E. Integrated wiring system | SAE PAPER 912058 | p 897 A92-45440 SAWKO, PAUL M. Performance of uncoated AFRSI blankets during multiple Space Shuttle flights INASA-TM-1038921 p 890 N92-29104 SAYLOR, BRETT D. Flexible manufacturing in repair of gas turbine engine components p 786 A92-49049 | AIAA PAPER 92-3524 | SAYLOR, D. A. Simultaneous imaging and interferometric turbule visualization in a high-velocity mixing/shear layer p 896 A92-45130 SCHAFRANEK, D. Some longitudinal handling qualities design guidelines for active control technology transport aircraft p 878 N92-28652 [NLR-TP-90129-U] SCHECHTER, JACOB Modern techniques for monitoring airborne telemetry p 857 A92-47560 SCHIFF, LEWIS B. Coupled numerical simulation of the external and engine inlet flows for the F-18 at large incidence p 793 A92-45493 I AIAA PAPER 92-26211 Analysis of a pneumatic forebody flow control concept about a full aircraft geometry p 799 A92-45530 [AIAA PAPER 92-2678] Navier-Stokes predictions for the F-18 wing and fuselage p 810 A92-46783 at large incidence SCHMIDT, ARLEN Airborne/shipborne PSK telemetry data link p 839 A92-47511 SCHMIDT, HANS-J. Ageing airplane repair assessment program for Airbus p 838 N92-30123 SCHMIDT, JOHN Scenario analysis of thigh gap related ejection injuries p 834 A92-44995 SCHMIT, L. A. Integrated aeroservoelastic wing synthesis by nonlinear programming/approximation concepts p 873 A92-46752 SCHMITT, V. Investigations of propulsion integration interference effects on a transport aircraft configuration p 849 A92-48739 [AIAA PAPER 92-3097] SCHRA, L. Short cracks and durability analysis of the Fokker 100 wing/fuselage structure p 910 N92-29603 INLR-TP-90336-U1 SCHRADER, STEPHEN M. Performance of hybrid ball bearings in oil and jet fuel p 900 A92-47176 SCHRAGE, D. P. On the adequacy of modeling turbulence and related p 847 A92-46945 effects on helicopter response SCHRECK, SCOTT J. Static and dynamic flow field development about a porous suction surface wing p 795 A92-45500 [AIAA PAPER 92-2628] SCHUSTER, E. P. Computational icing analysis for aircraft inlets p 836 A92-48793 [AIAA PAPER 92-3178] SCHWAB, S. Ignition delays, heats of combustion, and reaction rates of aluminum alkyl derivatives used as ignition and combustion enhancers for supersonic combustors p 894 A92-49134 [AIAA PAPER 92-3841] SCHWARTZ, R. J. Flow over a twin-tailed aircraft at angle of attack. II p 810 A92-46781 Temporal characteristics SCHWIRZKE, MARTIN F. J. A re-analysis of the causes of Boeing 727 'black hole p 833 A92-44985 landing' crashes SCOTT, W. Space Shuttle Orbiter auxiliary power unit status p 889 A92-45442 [SAE PAPER 912060] SCOTT, WILLIAM B. B-1B excels in conventional role p 786 A92-47971 SEALS, D.

Liquid flow-through cooling for avionics applications

p 902 A92-48448

SEASHOLTZ, RICHARD G. Laser anemometer measurements and computations in an annular cascade of high turning core turbine vanes p 830 N92-28980 INASA-TP-32521 SEHER, CHRIS C. Federal Aviation Administration aging aircraft nondestructive inspection research plan p 914 N92-30116 SEILER, F. Expansion tube experiments for the investigation of ram-accelerator-related combustion and gasdynamic [AIAA PAPER 92-3246] p 904 A92-48845 SEINER, J. M. Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 SELIG. MICHAEL S. Multi-point inverse design of an infinite cascade of airfoils [AIAA PAPER 92-2650] p 797 A92-45517 Simplified linear stability transition prediction method for separated boundary layers p 812 A92-46883 Analytical and experimental studies of heat pipe radiation cooling of hypersonic propulsion systems PAPÉR 92-3809) p 867 A92-49128 SENGE HEINRICH An Eulerian/Lagrangian method for computing p 814 A92-46952 blade/vortex impingement SENSBURG, O. Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 SENSBURG, OTTO Mathematical optimization: A powerful tool for aircraft p 851 N92-28474 SETTLES, G. S. Experiments on the enhancement of compressible mixing via streamwise vorticity. I - Optical measurements p 906 A92-49064 (AIAA PAPER 92-3549) SEYMOUR, THEODORE D. Life cycle costs of the C-130 electrical power system upgrade [AD-A246759] p 786 N92-28348 SFORZA, PASQUALE M. Airfoil pressure measurements during oblique shock wave-vortex interaction in a Mach 3 stream AIAA PAPER 92-2631] p 795 A92-45503 SHAFER, MARY F. In-flight simulation studies at the NASA Dryden Flight Research Facility INASA-TM-43961 SHALIN, VALERIE L. compilation - A Pilot's Associate application SHAMROTH, STEPHEN J. p 815 A92-46953 SHANG, JOSEPH S. chemical nonequilibrium [AIAA PAPER 92-2874]

p 853 N92-29110 Knowledge-sensitive task manipulation - Acquiring knowledge from pilots flying a motion-based flight p 916 A92-45064 An explanation-based-learning approach to knowledge

p 920 A92-48220

Three-dimensional blade vortex interactions

Computation of hypersonic flowfields in thermal and p 819 A92-47856

SHANTHAKUMARAN, P. The application of flight simulation models in support

of rotorcraft design and development p 884 N92-28527 SHAPPELL, SCOTT A. Use of a commercially available flight simulator during

aircrew performance testing [AD-A245922] p 883 N92-28407 SHARLAND, M. S. Harrier international programme p 841 A92-45305

The construction, application and interpretation of three-dimensional hybrid meshes p 919 A92-47089

SHAW, ROBERT J. Comparative study of turbulence models in predicting hypersonic inlet flows

[AIAA PAPER 92-3098] p 824 A92-48740 SHCHERBAK, V. G.

Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows p 827 A92-49188

SHEFFER, SCOTT G. Aerodynamic shape optimization of hypersonic configurations including viscous effects

p 795 A92-45506 [AIAA PAPER 92-2635] SHELBURNE, BRIAN J. Avionics software reusability recommendations observations p 921 A92-48502

SHEN, LI-ZHONG Durability analysis for a main bulkhead subjected to load p 848 A92-47664 on the body of an aircraft

SHEPPARD, JOHN W.

Developing intelligent automatic test equipment p 922 A92-48569

SHEVEL'KOV, S. G.

Effect of a fan of rarefaction waves on the development of disturbances in a supersonic boundary layer p 809 A92-46519

Wind-tunnel compressor stall monitoring using neural etworks p 918 A92-46817

SHI, RONG-MING Durability analysis for a main bulkhead subjected to load p 848 A92-47664 on the body of an aircraft

SHIBATA, KATSUHIKO Preliminary study of algorithm for real-time flutter

(SAE PAPER 912001) p 897 A92-45403 SHIMOMURA, TAKASHI

Spaceplane longitudinal aerodynamic parameter estimation by cable-mount dynamic wind-tunnel test [SAE PAPER 911980] p 788 A92-45385

Effect of walls on the supersonic reacting mixing layer p 912 N92-30065

SHIN, JAIWON Experimental and computational ice shapes and resulting drag increase for a NACA 0012 airfoil

[NASA-TM-105743] p 828 N92-28674 Results of a low power ice protection system test and a new method of imaging data analysis

[NASA-TM-105745] p 828 N92-28696 SHIRAHATTI, U. S.

Solutions of acoustic field problems using parallel computers

SHIRAYAMA, SUSUMU

Simple diagnosis for the quality of generated grid SHÓPOV. A. V.

Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958

SHYU. LIH-SHYUNG An experimental investigation of the effect of leading-edge extensions on directional stability and the

effectiveness of forebody nose strakes [AIAA PAPER 92-2715] p 802 A92-45554 SIBIO: SCOTT A.

Shock fitting with a finite volume approximation to the Euler equations p 796 A92-45513 [AIAA PAPER 92-2646]

SIDDIQUE M. S. Effect of the grid system on heat transfer computations

for high speed flows p 900 A92-47071 SILDER, STEPHEN H., JR.

Full mission simulation: A view into the future p 884 N92-28537

SILVERSTEIN, C. C. Analytical and experimental studies of heat pipe radiation

cooling of hypersonic propulsion systems [AIAA PAPER 92-3809] p 8 p 867 A92-49128 SIMEONOVA, IU. M.

Investigation of the structural inhomogeneity of a titanium alloy p 893 A92-47958 SIMMONS, J. M.

Measurement of shock-wave/boundary-layer interaction in a free-piston shock tunnel p 813 A92-46903

SIMON, HORST D. Future directions in computing and CFD

[AIAA PAPER 92-2734] p 917 A92-45489 SIMON, J. S. Dynamic control of aerodynamic instabilities in gas

p 870 N92-28466 SIMONIAN, S. O.

The method of determinant equations in the applied theory of optimal systems - Systems with 'rigid' constraints and with fixed boundary conditions p 917 A92-46629

SIMPSON, STEVEN S. An analysis of aircrew communication patterns and

content [AD-A246618] p 907 N92-28253

SIMPSON, WILLIAM R.

Developing intelligent automatic test equipment p 922 A92-48569 SIMSIC, CRAIG J.

Electric actuation system duty cycles p 877 A92-48494

SINGER, S. W. Computational aerodynamics in aircraft design

Challenges and opportunities for Euler/Navier-Stokes methods [SAE PAPER 911990] p 788 A92-45392

SINGH. D. J. Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection IAIAA PAPER 92-3251 | p 890 A92-48849

An adaptive grid method for computing the high speed

3D viscous flow about a re-entry vehicle

SMITH, ROBERT E.

STACEY, C. H. B.

in a free-piston shock tunnel

Measurement of shock-wave/boundary-layer interaction

p 813 A92-46903

p 799 A92-45534 1 AIAA PAPER 92-2685 | Armament Directorate Research Program STAEHLE, ROBERT p 904 A92-48847 [AIAA PAPER 92-3248] SMITH, SAMUEL H. Crew transportation for the 1990s. I - Commercializing Generation of spectra and stress histories for fatigue SIROVICH, L. manned flight with today's propulsion and damage tolerance analysis of fuselage repairs Eigenfunction analysis of turbulent mixing phenomena p 889 A92-46726 [AD-A250390] p 898 A92-45826 STALKER, R. J. SNELL, S. A. SITU. M. Waves and thermodynamics in high Mach number control Nonlinear inversion flight for A new vane swirler as applied to dual-inlet side-dump p 809 A92-46431 propulsive ducts supermaneuverable aircraft p 873 A92-46751 STANEWSKY, EGON [AIAA PAPER 92-3654] p 906 A92-49085 Numerical study of secondary separation in glancing Remote measurements of supercooled integrated liquid shock/turbulent boundary layer interactions | AIAA PAPER 92-3666| p 907 A92-49087 SIVANERI, NITHIAM T. water during WISP/FAA aircraft icing program Bilinear formulation applied to the stability and response p 915 A92-46788 of helicopter rotor blade p 847 A92-46930 STANKOV, B. B. SNYDER, DANIEL E. SJOLANDER, S. A. Remote measurements of supercooled integrated liquid Identifying design requirements using integrated analysis Establishing two-dimensional flow in a large-scale planar water during WISP/FAA aircraft icing program p 922 A92-48527 p 915 A92-46788 turbine cascade SORIESZCZANSKI-SORIESKI, JAROSLAW [AIAA PAPER 92-3066] p 823 A92-48720 STARNES, JAMES H., JR. Multidisciplinary design and optimization Damaged stiffened shell research at NASA. Langley SKOCH, GARY J. AGARD-PAPER-21 p 851 N92-28473 A 4-spot time-of-flight anemometer for small centrifugal Research Center p 914 N92-30115 SODERMAN PAUL T. compressor velocity measurements The design of test-section inserts for higher speed STEINBACH, DIETER [NASA-TM-105717] p 909 N92-29105 aeroacoustic testing in the Ames 80- by 120-foot wind Calculation of support interferences on the aerodynamic SLATER, ANDY coefficients for a wind tunnel calibration model tunnel Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced [NASA-TM-103915] [ESA-TT-1247] p 830 N92-29159 p 927 N92-28909 SOEDEL, SVEN M. STEINHOFF, JOHN Navier-Stokes code System for generating sequences of phased gust or taxi An Eulerian/Lagrangian method for computing lade/vortex impingement p 814 A92-46952 [AIAA PAPER 92-2700] p 800 A92-45542 p 845 A92-46800 blade/vortex impingement loadings SLINGERLAND, FRANK W. SOESMAN, J. L. Development of a multigrid transonic potential flow code Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 On the optimization of windshear warning and guidance p 836 A92-45425 systems INASA-CR-1904801 p 830 N92-29361 p 837 N92-29703 [NLR-TP-90196-U] STEINMETZ, P. SLOMSKI, J. F. Compressible Navier-Stokes solutions for a suction SOETRISNO, MOELJO

Numerical simulations of the transdetonative ram Aluminides modified by palladium - Protection of new boundary control airfoil parts by local finishing [ONERA, TP NO. 1992-49] [AIAA PAPER 92-2710] accelerator combusting flow field on a parallel compute p 802 A92-45551 p 893 A92-48610 p 894 A92-48848 [AIAA PAPER 92-3249] STEVENS, J. M. G. F. SORINE, MICHEL Expansion tube experiments for the investigation of S-76B certification for vertical take-off and landing Wideband control of gyro/accelerometer multisensors ram-accelerator-related combustion and gasdynamic operations from confined areas in a strapdown guidance system p 856 A92-46736 [NLR-TP-90286-U] p 852 N92-28714 [AIAA PAPER 92-3246] p 904 A92-48845 STEVENS, LISA Mixing in the dome region of a staged gas turbine SMELT, RONALD Scenario analysis of thigh gap related ejection injuries Power economy in high-speed wind tunnels by choice combustor p 834 A92-44995 [AIAA PAPER 92-3089] p 903 A92-48734 of working fluid and temperature p 881 A92-45275 STEWART, J. E. SPALL, ROBERT E. SMERECZNIAK, P. Grid generation and compressible flow computations Computational study of transition front on a swept wing Comparative investigation of multiplane thrust vectoring about a high-speed civil transport configuration leading-edge model p 919 A92-47055 nozzles [AIAA PAPER 92-3263] p 795 A92-45502 p 864 A92-48858 IAIAA PAPER 92-26301 STEWART, JOHN E. SPECTOR, J. MICHAEL SMIT, KEVIN L. Surface grid generation in a parameter space [AIAA PAPER 92-2717] p 803 A Design specifications for the Advanced Instructional A geometry-integrated approach to multiblock grid p 803 A92-45556 Design Advisor (AIDA), volume 2 p 919 A92-47083 [AD-A248202] p 923 N92-29188 Remote telemetry concepts SMITH, A. G. p 882 A92-47562 SPEKREIJSE, S. P. The experimental and computational study of jet STOCKER, HAROLD L. impingement flowfields with reference to VSTOL aircraft The design of a system of codes for industrial calculations of flows around aircraft and other complex Analytical design and demonstration of a low-cost p 787 A92-45324 expendable turbine engine combustor [AIAA PAPER 92-3754] performance aerodynamic configurations SMITH, BETH W. p 867 A92-49112 IAIAA PAPER 92-2619] p 917 A92-45492 Assessment of army aviators' ability to perform individual STOFFER, JAMES O. SPEKREYSE, S. P. Fabrication and mechanical properties of an optically and collective tasks in the aviation networked simulator New concepts for multi-block grid generation for flow p 888 N92-29709 1AD-A2502931 transparent glass fiber/polymer matrix composite domains around complex aerodynamic configurations SMITH, BRIAN E. p 817 A92-47079 Large-scale wind tunnel studies of a jet-engined powered STOLCIS, LUCA p 842 A92-45313 ejector-lift STOVL aircraft Application of an unstructured Navier-Stokes solver to Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft Aerothermodynamic calculations for the Space Shuttle multi-element airfoils operating at transonic maneuver conditions [AIAA PAPER 92-2953] [AIAA PAPER 92-3094] p 824 A92-48738 p 821 A92-47917 [AIAA PAPER 92-2638] p 796 A92-45507 SMITH, BROOKE C. SPELTEN, ROBERT STONE, PHILIP L. Production of periodical Mach number variations in high Paint removal using cryogenic processes Dynamically enhanced sustained lift using oscillating leading-edge flaps AD-A247668] subsonic flow in a blow down wind tunnel, and its influence p 895 N92-28912 p 794 A92-45497 I AIAA PAPER 92-26251 on profile measurements STOOKESBERRY, D. SMITH, C. F. IETN-92-914921 p 833 N92-29889 Prediction of inviscid supersonic/hypersonic aircraft Experimental and analytical study of close-coupled SPETNAGEL, D. flowfields p 810 A92-46785 ventral nozzles for ASTOVL aircraft p 861 A92-45325 Comparative investigation of multiplane thrust vectoring STORMER, WILLIAM H. Frequency domain flight testing and analysis of an OH-58D helicopter p 847 A92-46943 SMITH, H. A. nozzles Lubricant evaluation and performance 2 [AIAA PAPER 92-3263] p 864 A92-48858 p 895 N92-28398 [AD-A247464] STORMVANLEEUWEN, S. SPILLMAN, WILLIAM B., JR. SMITH. J. A simple and low cost system to measure delay times Wavelength encoded fiber optic angular displacement Evaluation of measured-boundary-condition methods for in pneumatic systems p 857 A92-48046 sensor 3D subsonic wall interference INLR-TP-90174-U1 p 859 N92-28644 SPINETTI, R. L. [NLR-TR-88072-U] p 832 N92-29884 STORTZ, MICHAEL W. Calculation of high speed base flows SMITH, PHILLIP N. Integrated flight/propulsion control for supersonic p 799 A92-45531 [AIAA PAPER 92-2679] p 872 A92-45320 A rotorcraft flight database for validation of vision-based STOVL aircraft SPRAGUE, JOHN R. ranging algorithms STOTT, G. Current technology propulsion systems meet the STOVL [NASA-TM-103906] Evolution of ASTOVL aircraft design p 841 N92-29103 p 860 A92-45307 window of opportunity SMITH, R. E. p 842 A92-45311 SREENIVASAN, K. R. Gridding strategies and associated results for winged STOW, PETER high-Reynolds-number Remarks on p 918 A92-47051 An unfactored implicit scheme for 3D inviscid transonic experiments and facilities p 881 A92-45267 Grid generation and compressible flow computations flows [AIAA PAPER 92-2668] about a high-speed civil transport configuration p 798 A92-45523 Buckling, postbuckling and crippling of thin walled composite airframe structures under compression p 919 A92-47055 STRAUB, F. K. NASA Workshop on future directions in surface modeling A general purpose nonlinear rigid body mass finite and grid generation p 899 A92-46940 element for application to rotary wing dynamics INASA-CP-100921 p 831 N92-29625 SRULIJES, J. p 846 A92-46924 SMITH, RICHARD B. Expansion tube experiments for the investigation of STRAUS, J. Integrated flight control systems - Architectural ram-accelerator-related combustion and gasdynamic Boundary-layer measurements during a parallel considerations for future aircraft concepts blade-vortex interaction p 872 A92-45322 JAIAA PAPER 92-32461 p 904 A92-48845 IAIAA PAPER 92-26231 p 794 A92-45495

SINHA, N.

Progress towards the development of transient ram

accelerator simulation as part of the U.S. Air Force

p 831 N92-29402

A comparison of the calculated and experimental

off-design performance of a radial flow turbine [NASA-CR-189207] p 831

PERSONAL AUTHOR INDEX
STREET, A. B.
VSTOL engine design evolution - Growth of the Pegasus engine for Harrier p 860 A92-45306
STREET, T. Simultaneous imaging and interferometric turbule
visualization in a high-velocity mixing/shear layer
p 896 A92-45130 STROCK, THOMAS W.
Hot gas ingestion characteristics and flow visualization
of a vectored thrust STOVL concept p 860 A92-45316
STRONG, A. B. Composites in manufacturing - Case studies
[ISBN 0-87263-406-X] p 784 A92-47403
Filament winding of composite isogrid fuselage structures p 784 A92-47405
STRUBLE, DAVID G.
A new development in embedded computer performance measurement p 921 A92-48506
STRYKOWSKI, P. J. The enhancement of mixing in high-speed heated jets
using a counterflowing nozzle
[AIAA PAPER 92-3262] p 825 A92-48857 STUCKEY, C. I.
Heat transfer to a cylinder submerged in a rectangular
cavity in supersonic flow [AIAA PAPER 92-2949] p 901 A92-47913
SU, T. Y. A geometry-integrated approach to multiblock grid
generation p 919 A92-47083
SUAREZ, CARLOS J. Forebody vortex control for suppressing wing rock on
a highly-swept wing configuration
[AIAA PAPER 92-2716] p 803 A92-45555 SUENAGA, HISASHI
Replacement of the NAL high pressure air storage
system [NAL-TM-634] p 888 N92-28835
SUGAHARA, N. Conceptual study of separated core ultra high bypass
engine
[AIAA PAPER 92-3775] p 867 A92-49119
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p.811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p.923 A92-48903
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p.811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p.811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p.923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p.867 A92-49120
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p.811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p.923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p.867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panet method
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag P 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-33776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag P 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finitle wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag p 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag P 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finitle wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag P 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] P 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] P 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach P 834 A92-45041
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] P 790 A 22-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach P 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems P 840 A92-48480 SUNDER, R.
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading p891 A92-45236
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading p891 A92-45266
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading p 891 A92-45236 SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] P 790 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] P 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach P 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems P 840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading P 891 A92-45236 SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903 Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] p 790 A92-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] p 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p 840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p 927 N92-28556
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag P 811 A92-46814 SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach P 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems P 840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] P 927 N92-28556
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P 867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finitle wing by a panel method [SAE PAPER 912020] P 790 A 22-45413 A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] P 790 A92-45419 SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P 821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach P 834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems P 840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading SUHHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] P 927 N92-28556 SUZUKI, MASAMITU Replacement of the NAL high pressure air storage system [NAL-TM-634] P 888 N92-28835
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912029] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid p821 A92-48019 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p840 A92-45236 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading p891 A92-45236 SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] p927 N92-28556 SUZUKI, MASAMITU Replacement of the NAL high pressure air storage system [NAL-TM-634] p 888 N92-28835
SUGIMOTO, TAKESHI Wing design for hanggliders having minimum induced drag SUGIYAMA, NANAHISA Derivation of ABCD system matrices from nonlinear dynamic simulation of jet engines [AIAA PAPER 92-3319] Design and off-design point characteristics of Separated Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] P867 A92-49120 SUGIYAMA, YOSHIYUKI Aerodynamic characteristics near the tip of a finite wing by a panel method [SAE PAPER 912020] A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer [SAE PAPER 912020] SUH, JUNG-CHUN Some exact and numerical results for plane steady sheared flow of an incompressible inviscid fluid P821 A92-45413 SUMWALT, ROBERT L., III Eliminating pilot-caused altitude deviations - A human factors approach p834 A92-45041 SUN, ZHONGKANG Location and tracking technique in a multistatic system established by multiple bistatic systems p840 A92-48480 SUNDER, R. Contribution of individual load cycles to crack growth under aircraft spectrum loading p891 A92-45236 SUTHERLAND, LOUIS C. Evaluation of outdoor-to-indoor response to minimized sonic booms [NASA-CR-189643] P927 N92-28556 SUZUKI, MASAMITU Replacement of the NAL high pressure air storage system [NAL-TM-634] P888 N92-28835 SUZUKI, MASAYUKI Ducted fan VTOL for working platform

Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test |SAE PAPER 911979| p 872 A92

Concept of a one-dimensional model of the dynamic

SWART, PAUL W.

SWIRSKI, KONRAD

behavior of a gas turbine

RTOK elimination with TSMM

p 872 A92-45384

p 902 A92-48446

p 862 A92-47791

	TIRRES, LIZET
SWOPE, G. H.	TANDON, G. P.
Axial alignment of short-fiber titanium aluminide	Microbiological spoilage of aviation turbine fuel. II -
composites by directional solidification	Evaluation of a suitable biocide p 891 A92-45600
p 892 A92-46838 SYRYCZYNSKI, JACEK	TANG, D. M. Chaotic oscillation in helicopter blade stall response
A new method of helicopter rotor blade motion control	p 846 A92-46922
p 875 A92-47786	TANG, DENG-BIN The calculation of three-dimensional compressible
SYTSMA, H. A. Numerical investigation into high-angle-of-attack	boundary layer stability on swept wings
leading-edge vortex flow	p 818 A92-47684
[AIAA PAPER 92-2600] p 791 A92-45477	TANG, F. C. Unsteady pressure and load measurements on an
SZMELTER, J. Mesh adaptivity with the quadtree method	F/A-18 vertical fin at high-angle-of-attack
p 816 A92-47041	[AIAA PAPER 92-2675] p 798 A92-45529
	TANI, KOICHIRO Experimental validation of scramjet nozzte
T	Experimental validation of scramjet nozzle performance
•	[AIAA PAPER 92-3290] p 864 A92-48879
TADA, AKIRA	TANNER, JOHN A.
Functional mock-up tests for flight control system of the NAL QSTOL research aircraft 'ASKA'	Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128
[SAE PAPER 912036] p 881 A92-45422	TATGE, R. B.
TADGHIGHI, H.	Gas turbine exhaust system silencing design
Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions	p 882 A92-47365 TATTERSALL, P.
p 815 A92-46957	Prediction and measurement of jet flowfield features for
TAFLIN, DAVE	ASTOVL aircraft p 787 A92-45318
BUWICE - An interactive icing program applied to engine inlets	TAYLOR, ARTHUR C., III Taylor series approximation of geometric shape variation
[AIAA PAPER 92-3179] p 922 A92-48794	for the Euler equations p 899 A92-46916
TAGHAVI, R.	TELFER, ROSS
A computational study of advanced exhaust system transition ducts with experimental validation	A training program for airline line instructors
[AIAA PAPER 92-3794] p 907 A92-49126	p 835 A92-45044 TENHAVE, J. M.
TAKAHASHI, HITOSHI	NARSIM: A real-time simulator for air traffic control
Wind tunnel investigation of an improved upper surface blown flap transport semi-span model	research [NLR-TP-90147-U] p 888 N92-29204
[SAE PAPER 911993] p 789 A92-45395	European studies to investigate the feasibility of using
Aerodynamic development of boundary layer control	1000 ft vertical separation minima above FL 290. Part 1:
system for NAL QSTOL research aircraft 'ASKA' [SAE PAPER 912010] p 843 A92-45410	Overview of organisation, techniques employed, and
TAKAKI, RYOJI	conclusions [NLR-TP-91062-U-PT-1] p 841 N92-29605
Predicted pressure distribution on a prop-fan blade	TENNING, CARL
through Euler analysis p 810 A92-46791 TAKAMORI, SUSUMU	Electric power generating system for the Boeing 777
Air ejector experiments using the two-dimensional	airplane [SAE PAPER 912050] p 861 A92-45434
supersonic cascade tunnel: Zero secondary flow	TERLIZZI, A.
performance [NAL-TM-632] p 887 N92-28829	Numerical computations of transonic flows through
TAKASAWA, KINGO	cascades (AIAA PAPER 92-3041) p 822 A92-48702
Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization	TERUI, YUSHI
[SAE PAPER 912052] p 843 A92-45436	A simulator study of a flight reference display for
Structural concept of main wings of high altitude	powered-lift STOL aircraft [SAE PAPER 912067] p 855 A92-45449
unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material	TEWARI, K. C.
[SAE PAPER 912053] p 843 A92-45437	Microbiological spoilage of aviation turbine fuel. II -
TAKEDA, NOBUO Impact response of composite UHB propeller blades	Evaluation of a suitable biocide p 891 A92-45600 THAYER, E.
[SAE PAPER 912046] p 861 A92-45430	Comparative investigation of multiplane thrust vectoring
TAKEUCHI, YASURO	nozzles
Functional mock-up tests for flight control system of the NAL QSTOL research aircraft 'ASKA'	[AIAA PAPER 92-3263] p 864 A92-48858 THIBERT, J. J.
[SAE PAPER 912036] p 881 A92-45422	The A320 laminar fin programme
TAKIZAWA, MINORU	[ONERA, TP NO. 1992-23] p 849 A92-48586
Spaceplane longitudinal aerodynamic parameter estimation by cable-mount dynamic wind-tunnel test	THOM, JAMES An artificial intelligence approach for the verification of
[SAE PAPER 911980] p 788 A92-45385	requirements for aircraft electrical power systems
TAKSAWA, KINGO On the possibility of freezing and sticking phenomena	p 863 A92-48481
in a transport during the ground taxiing and takeoff run	THOMADAKIS, M. P. Transonic unsteady inviscid and viscous flow's
and on the preventions of the hazard	simulation around 2-D moving bodies
[SAE PAPER 912042] p 836 A92-45426 TAM, CHRISTOPHER K. W.	[AIAA PAPER 92-2704] p 801 A92-45546
Relationship between the instability waves and noise	THOMAS, SCOTT Computational analysis of ramjet engine inlet
of high-speed jets p 924 A92-45835	interaction
TAM, L. T. LU-SGS implicit scheme for entry vehicle flow	(AIAA PAPER 92-3102) p 824 A92-48744
computation and comparison with aerodynamic data	THOMPSON, DONALD O. NDE research efforts at the FAA Center for Aviation
[AIAA PAPER 92-2671] p 798 A92-45526 TAMIGNIAUX, T. L. B.	Systems Reliability p 914 N92-30119
Recent CFD applications on jet transport	THOMPSON, J. F.
configurations	Numerical grid generation in computational fluid dynamics and related fields; Proceedings of the 3rd
[AIAA PAPER 92-2658] p 844 A92-45519 TAMPLIN, G. C.	International Conference, Universidad Politecnica de
A USAF assessment of STOVL fighter options	Cataluna, Barcelona, Spain, June 3-7, 1991
p 842 A92-45310	[ISBN 0-444-88948-5] p 918 A92-47035 TINOCO, E. N.
TAMURA, YOSHIAKI Recent applications of the FNS zonal Method to complex	Recent CFD applications on jet transport
flow problems	configurations
[SAE PAPER 912003] p 789 A92-45404 TANAKA, KEIJI	[AIAA PAPER 92-2658] p 844 A92-45519 TIRRES, LIZET

A simulator study of a flight reference display for

p 855 A92-45449

powered-lift STOL aircraft

[SAE PAPER 912067]

T05 - 407 11110 -		WANDALO-LL
TODA, NOBUHIRO Replacement of the NAL high pressure air storage	TSUYUKI, TARO Oscillation of oblique shock waves generated in a two	VANDALSEM, W. R. NASA Workshop on future directions in surface modeling
System	dimensional asymmetric nozzle	and grid generation
[NAL-TM-634] p 888 N92-28835	[SAE PAPER 912061] p 791 A92-45443	[NASA-CP-10092] p 831 N92-29625
TODD, JOHN R.	TU, EUGENE L.	VANDEKERCKHOVE, D.
Modular avionics - A commercial perspective	Effect of canard deflection on close-coupled canard-wing-body aerodynamics	Active control of blade vortex interaction
p 858 A92-48427 Making fly-by-light a reality p 877 A92-48499	[AIAA PAPER 92-2602] p 792 A92-45479	p 814 A92-46944 VANDENBERG. J. I.
TOGNACCINI, R.	TU, YEN	Analysis of results of an Euler-equation method applied
Boundary conditions for Euler equations at internal block	Unsteady Navier-Stokes simulations of supersonic flow	to leading-edge vortex flow
faces of multi-block domains using local grid refinement	over a three-dimensional cavity	[NLR-TP-90368-U] p 827 N92-28657
[NLR-TP-90134-U] p 908 N92-28712	[AIAA PAPER 92-2632] p 795 A92-45504 TUCK, PAUL D.	Development and validation of a characteristic boundary
TOLPADI, A. K. A numerical study of two-phase flow in gas turbine	Enhancement of ground handling through optimum	condition for a cell-centered Euler method [NLR-TP-90144-U] p 828 N92-28692
combustors	selection/use of Ground Support Equipment (GSE)	VANDENDAM, R. F.
[AIAA PAPER 92-3468] p 905 A92-49015	[SAE PAPER 911973] p 881 A92-45380	Constrained spanload optimization for minimum drag of
TOMLINSON, B. N.	TUNICK, ARNOLD	multi-lifting-surface configurations
Initial validation of a R/D simulator with large amplitude	Assessment of one-dimensional icing forecast model applied to stratiform clouds p 915 A92-46803	[NLR-TP-89126-U] p 828 N92-28660
motion p 886 N92-28546 TONG, P.	TURVER. K. D.	VANDERBERG, B. Turbulence modeling: Survey of activities in Belgium and
Current DOT research on the effect of multiple site	24-bit flight test data recording format	the Netherlands, and appraisal of the status and a view
damage on structural integrity p 913 N92-30112	p 900 A92-47528	on the prospects
TONGUE, BENSON H.	TUTTLE, F. L.	[NLR-TP-90184-U] p 908 N92-28694
Chaotic dynamic behavior in a simplified rotor blade lag	Verification and validation of F-15 and S/MTD unique software p 921 A92-48515	VANDERVEGT, J. J. W.
model p 846 A92-46926 TORELLA, GIOVANNI	Software p 921 A92-40313	Methods for direct simulation of transition in hypersonic boundary layers 2 p 912 N92-30064
Expert systems for the trouble-shooting and the	U	boundary layers 2 p 912 N92-30064 VANDERVOOREN, J.
diagnostics of engines	U	Wave drag determination in the transonic full-potential
[AIÃA PAPER 92-3327] p 923 A92-48910	UCHIDA. TADAO	flow code MATRICS
The numerical simulation of the main fuel control unit	Functional mock-up tests for flight control system of the	[NLR-TP-90062-U] p 828 N92-28709
of gas turbine engines [AIAA PAPER 92-3760] p 867 A92-49115	NAL QSTOL research aircraft 'ASKA'	VANDERWEES, A. J.
[AIAA PAPER 92-3760] p 867 A92-49115 TORII, HIROSHI	[SAE PAPER 912036] p 881 A92-45422	Wave drag determination in the transonic full-potential flow code MATRICS
Response characteristics of a wing in supersonic flow	UCIKAWA, ISOROKU	[NLR-TP-90062-U] p 828 N92-28709
near flutter boundary	Functional mock-up tests for flight control system of the NAL QSTOL research aircraft 'ASKA'	VANENGELEN, J. A. J.
[\$AE PAPER 911999] p 789 A92-45401	[SAE PAPER 912036] p 881 A92-45422	Some longitudinal handling qualities design guidelines
TOTH, D. K. Lubricant evaluation and performance 2	UDD, ERIC	for active control technology transport aircraft
[AD-A247464] p 895 N92-28398	Fiber optic and laser sensors VIII; Proceedings of the	[NLR-TP-90129-U] p 878 N92-28652 Results of a flight simulator experiment to establish
TOWERS, C. E.	Meeting, San Jose, CA, Sept. 17-19, 1990	handling quality guidelines for the design of future transport
The application of particle image velocimetry (PIV) in a	[SPIE-1367] p 901 A92-48026 UDIN, SERGEI V.	aircraft
short-duration transonic annular turbine cascade	Wing mass formula for subsonic aircraft	[NLR-MP-88044-U] p 854 N92-29616
[ASME PAPER 91-GT-221] p 899 A92-46825 TOWERS, D. P.	p 845 A92-46812	VANGEL, MARK G.
The application of particle image velocimetry (PIV) in a	UENISHI, K.	A sensitivity analysis on component reliability from fatigue life computations
short-duration transonic annular turbine cascade	Commercial turbofan engine exhaust nozzle flow	[AD-A247430] p 908 N92-28425
[ASME PAPER 91-GT-221] p 899 A92-46825	analyses using PAB3D [AIAA PAPER 92-2701] p 801 A92-45543	VANHEMEL, PAUL E.
TREXLER, CARL A.		The evaluation of simulator effectiveness for the training
	ULLAH. DOUGLAS	
Operating characteristics at Mach 4 of an inlet having	ULLAH, DOUGLAS Real time presentation for RAFALE in-flight tests	of high speed, low level, tactical flight operations
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces		p 885 N92-28539
Operating characteristics at Mach 4 of an inlet having	Real time presentation for RAFALE in-flight tests p 882 A92-47522	
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance	Real time presentation for RAFALE in-flight tests	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124	Real time presentation for RAFALE in-flight tests p 882 A92-47522	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R.	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B.	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G.	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A last, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived	V VACHON, JAMES Optics in aircraft engines Optics in aircraft p 849 A92-48500 VAFAI, K. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAYRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNULRN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft vALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-48579 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A last, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A last, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALQ, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALCET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind turnnels
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P.	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A last, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing	Real time presentation for RAFALE in-flight tests p 882 A92-47522 V VACHON, JAMES Optics in aircraft engines p 926 A92-48500 VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] p 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft P 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] P 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines P 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements P 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] P 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] P 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional,	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A last, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508	V VACHON, JAMES Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines p 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method vonfigurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 823 A92-48723
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders	V VACHON, JAMES Optics in aircraft engines Optics in aircraft of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method P 918 A92-47043 VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [JAIAA PAPER 92-3073] p 823 A92-48723 VERHOFF, A.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft OALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALCET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] P 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] P 823 A92-48729	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073) p 823 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043]	V VACHON, JAMES Optics in aircraft engines Optics in aircraft of thermal performance of wheel outboard of an aircraft p 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] P 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method P 918 A92-47043 VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] P 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 823 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft flowfields p 810 A92-46785
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427	VACHON, JAMES Optics in aircraft engines Optics in aircraft on thermal performance of wheel outboard of an aircraft Outboard of an aircraft P 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] P 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines P 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements P 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] P 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method P 918 A92-47043 VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] P 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] P 823 A92-48729 VAN DEN BERG, J. I. Numerical investigation into high-angle-of-attack leading-edge vortex flow	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073) p 823 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912041] p 790 A92-45427 TSUBOI, NOBUYUKI Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft P 849 A92-48352 VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] P 806 A92-45575 VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines P 870 N92-28466 VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements P 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] P 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] P 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] VAN DEN BERG, J. I. Numerical investigation into high-angle-of-attack leading-edge vortex flow [AIAA PAPER 92-2600] P 791 A92-45477	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TF-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073) p 823 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft flowfields p 810 A92-46785 VILSMEIER, J. Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29550
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 TSUBOI, NOBUYUKI Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft pagines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] VAN DEN BERG, J. I. Numerical investigation into high-angle-of-attack leading-edge vortex flow [AIAA PAPER 92-2600] P 791 A92-45477 VAN LEER, BRAM	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence P 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 823 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft flowfields VILSMEIER, J. Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 VINOGRADOV, V.
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JTBD static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 91204] p 790 A92-45427 TSUBOI, NOBUYUKI Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 91204] p 789 A92-45412 TSUKANO, YUKICHI In-filight simulation of backside operating models using	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft engines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfoils [AIAA PAPER 92-2636] VALVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] p 905 A92-48937 VALLET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method p 918 A92-47043 VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] p 795 A92-45505 VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] p 823 A92-48729 VAN DEN BERG, J. I. Numerical investigation into high-angle-of-attack leading-edge vortex flow [AIAA PAPER 92-2600] p 791 A92-45477 VAN LEER, BRAM An investigation of passive control methods for	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence p 912 N92-30042 VENNEMANN, D. New hypersonic test methods developed at ONERA - The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073) p 823 A92-48723 VERHOOFF, A. Prediction of inviscid supersonic/hypersonic aircraft flowfields p 810 A92-46785 VILSMEIER, J. Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 VINOGRADOV, V. Experimental investigation of fliquid carbonhydrogen fuel
Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 TRIPP, JAMES S. Communication: An important element of maintenance and repair p 838 N92-30124 TRIPPENSEE, GARY Update of the X-29 high-angle-of-attack program [SAE PAPER 912006] p 783 A92-45407 TROUTT, T. R. Active control of vortex structures in a separating flow over an airfoil [AIAA PAPER 92-2728] p 804 A92-45563 TRUE, B. Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735 TRYON, ROBERT G. Failure model development for an integrally bladed turbine wheel [AIAA PAPER 92-3420] p 865 A92-48979 TSAI, BOR-JANG Computation of turbulent flow about cone-derived waverider [AIAA PAPER 92-2726] p 804 A92-45562 TSANGARIS, S. Transonic unsteady inviscid and viscous flow's simulation around 2-D moving bodies [AIAA PAPER 92-2704] p 801 A92-45546 TSAO, MIKE Turbine aircraft engine operational trending and JT8D static component reliability study [DOT/FAA/CT-91/10] p 870 N92-28686 TSO, JIN Vortex trapping on a 60 degree delta wing [AIAA PAPER 92-2639] p 796 A92-45508 TSUBOI, KIYOSHI Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 TSUBOI, NOBUYUKI Numerical simulation of a supersonic jet impingement on a ground [SAE PAPER 912014] p 789 A92-45412	VACHON, JAMES Optics in aircraft engines Optics in aircraft engines Optics in aircraft pagines VAFAI, K. Characterization of thermal performance of wheel outboard of an aircraft VALAREZO, WALTER O. Separation control on high Reynolds number multi-element airfolis [AIAA PAPER 92-2636] VALAVANI, L. Dynamic control of aerodynamic instabilities in gas turbine engines VALC, ZDENEK New methods to determine the transmission loss of partitions using sound intensity measurements p 924 A92-45879 VALCO, MARK J. Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests [AIAA PAPER 92-3364] VALET, M. G. Anisotropic control of mesh generation based upon a Voronoi type method VAN DAM, C. P. Practical design optimization of wing/body configurations using the Euler equations [AIAA PAPER 92-2633] VAN DE WALL, ALLAN G. A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] VAN DEN BERG, J. I. Numerical investigation into high-angle-of-attack leading-edge vortex flow [AIAA PAPER 92-2600] P 791 A92-45477 VAN LEER, BRAM	VANKLEEF, E. R. A. Aircraft simulation and pilot proficiency: From surrogate flying towards effective training p 884 N92-28532 VANLENT, M. Flow gradient corrections on hot-wire measurements using an X-wire probe [NLR-TP-90255-U] p 829 N92-28713 VANMOL, DENIS O. Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 VANNUNEN, J. W. G. LAH-main rotor model test at the DNW [NLR-TP-90305-U] p 852 N92-28687 VARESHNYA, DEEPAK Fiber optic speed sensor for advanced gas turbine engine control p 857 A92-48044 VASSBERG, JOHN C. A fast, implicit unstructured-mesh Euler method [AIAA PAPER 92-2693] p 917 A92-45589 VAVRECK, ANDREW N. Flexible manufacturing in repair of gas turbine engine components [AIAA PAPER 92-3524] p 786 A92-49049 VEERAVALLI, SRINIVAS V. A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence VENNEMANN, D. New hypersonic test methods developed at ONERA-The R5 and F4 wind tunnels [ONERA, TP NO. 1992-39] p 882 A92-48600 VERDON, J. M. Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 832 A92-48723 VERHOFF, A. Prediction of inviscid supersonic/hypersonic aircraft flowfields VILSMEIER, J. Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 VINOGRADOV, V.

VITA	GL	IAI	NO.	P.	L.
------	----	-----	-----	----	----

The design of a system of codes for industrial calculations of flows around aircraft and other complex aerodynamic configurations

p 917 A92-45492 [AIAA PAPER 92-2619] New concepts for multi-block grid generation for flow domains around complex aerodynamic configurations

p 817 A92-47079 VITALETTI, MARCELLO

An unfactored implicit scheme for 3D inviscid transonic

[AIAA PAPER 92-2668] p 798 A92-45523

VÖDEGEL, H. J. G. C.

S-76B certification for vertical take-off and landing operations from confined areas

p 852 N92-28714 VOGEL A. A.

NASA Workshop on future directions in surface modeling

and grid generation INASA-CP-100921 n 831 N92-29625

VOIRON, T. Aerothermodynamic calculations for the Space Shuttle

Orbiter [AIAA PAPER 92-2953] p 821 A92-47917

VRANOS, A.

Experimental study of cross-stream mixing in a rectangular duct [AIAA PAPER 92-3090] p 903 A92-48735

WADSWORTH, MARK

Resin transfer molding of a complex composite aircraft p 784 A92-47410 structure

WAGNER, STEVEN M.

Gulf Range Drone Control Upgrade System Mobile Control System p 882 A92-47567

WAKE, ALISON J.

Ground surface erosion - British Aerospace test facility and experimental studies p 881 A92-45323

WAKE, BRIAN E. Navier-Stokes and Euler solutions for an unmanned

aerial vehicle p 792 A92-45483 [AIAA PAPER 92-2609] Initial validation of an unsteady Euler/Navier-Stokes flow solver for helicopter rotor airloads in forward flight

p 815 A92-46956

WALEFFE, FABIAN

Non-linear interactions in homogeneous turbulence with p 912 N92-30044 and without background rotation WALKER, MARY M.

computational/experimental Joint aerodynamics research on hypersonic vehicle. II - Computational p 812 A92-46891

WALSH, KEVIN R.

Summary of the effects of engine throttle response on

airplane formation-flying qualities [AIAA PAPER 92-3318] p 877 A92-48902

WALSH, M.

An investigation of passive control methods for shock-induced separation at hypersonic speeds

p 808 A92-45596 [AIAA PAPER 92-2725]

WALTER, PATRICK L.

Aging aircraft NDI Development and Demonstration p 915 N92-30120 Center (AANC): An overview

WANG, C.-W. turbulence model based on RNG for quasi-three-dimensional cascade flows [AIAA PAPER 92-3312] p 825 A92-48898

WANG, H. Y. The influence of spray angle on the continuous- and discrete-phase flowfield downstream of an engine combustor swirl cup

p 863 A92-48832 (AIAA PAPER 92-3231)

WANG, J.-A.

LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection

p 800 A92-45539 [AIAA PAPER 92-2692]

WANG, J.-C.

Application of face-gear drives in helicopter transmissions

[NASA-TM-105655] p 908 N92-28434

Separation patterns and flow structures about a hemisphere-cylinder at high incidences

[AIAA PAPER 92-2712] p 807 A92-45593 WANG, PAUL

A neural network based postattack damage assessment system p 922 A92-48520

WANG, SHAQQING

Calculation methods on equivalence ratio of multi-propellant for propulsion system

p 893 A92-48269

WANG, YI-YUN

The numerical simulation of compressible flow around an airfoil at high angle of attack p 818 A92-47686

WANHILL R. J. H.

Diffuser casing upgrade for an advanced turbofan INLR-TP-90097-U] NLR-TP-90097-U] p 870 N92-28711 Short cracks and durability analysis of the Fokker 100 wing/fuselage structure p 910 N92-29603

INLR-TP-90336-U WARD, S. Prismatic grid generation with an efficient algebraic

method for aircraft configurations
[AIAA PAPER 92-2721]

p 803 A92-45559 WARDLAW, A. B., JR.

Comparison of two flux splitting schemes for calculation of ogive-cylinder at M = 3.5 and alpha = 18 deg

I AIAA PAPER 92-2667 I p 806 A92-45582 WARFIELD, MATTHEW J. Computational fluid dynamics applications in airplane

cabin ventilation system design p 788 A92-45394 ISAE PAPER 9119921

WARREN, ERIC S. A new approach for the calculation of transitional

flows [AIAA PAPER 92-2669] p 798 A92-45524

WATANABE, SHIGEYA

A scramjet nozzle experiment with hypersonic external flow

p 864 A92-48878 I AIAA PAPER 92-3289 I WATZI AWICK, ROBERT

Examination of the main error factors with regards to secondary losses in compression and turbine cascades by variations of the blade picture ratio [ETN-92-91493]

WAZYNIAK, JOSÉPH A.

Current technology propulsion systems meet the STOVL window of opportunity p 860 A92-45307 WEATHERILL. N. P.

Mesh adaptivity with the quadtree method

p 816 A92-47041 Generation of unstructured grids within a hybrid multi-block environment

Remote measurements of supercooled integrated liquid water during WISP/FAA aircraft icing program p 915 A92-46788

WEBSTER, B. E.

The subsonic and transonic flow around the leading edge of a thin airfoil with a parabolic nose [AIAA PAPER 92-2649] p 797 A92-45516

WEGENER, D. Comparison between two 3D-NS-codes and experiment

on a turbine stator [AIAA PAPER 92-3042] p 822 A92-48703

WEI. JIAN-QIU A method of failure analysis of complicated structures

p 901 A92-47656 WEI. YING-JYI P.

F-16 failure detection isolation and estimation study p 876 A92-48490

Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena [AIAA PAPER 92-2876] p 820 A92-47858

WELLMLIENSTER, K. J.

Gridding strategies and associated results for winged entry vehicles p 918 A92-47051 Characteristics of the Shuttle Orbiter leeside flow during

a reentry condition [AIAA PAPER 92-2951] p 821 A92-47915

WEIMER, M. M.

Design and test of an Active Tip Clearance System for centrifugal compressors

AIAA PAPER 92-31891 p 863 A92-48801

WEINSTEIN, LISA F.

The standardization of military head-up display symbology p 855 A92-44929 An aircraft landing accident caused by visually induced spatial disorientation p 834 A92-44993

WELCH, STEVEN R.

MassInfo - An intelligent mass properties information p 928 A92-47628

WELLBORN, STEVEN R.

Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct p 800 A92-45541 AIAA PAPER 92-26991

WELTON, W. C.

Compressible Navier-Stokes solutions for a suction boundary control airfoil IAIAA PAPER 92-27101 p 802 A92-45551

WENDEL, HORST

Bistatic scattering on a monostatic radar range p 849 A92-48408

New method of swirl control in a diffusing S-duct p 809 A92-45859 WERNET, MARK P.

A 4-spot time-of-flight anemometer for small centrifugal compressor velocity measurements

[NASA-TM-105717] p 909 N92-29105

WESSON, LAURENCE N.

Fiber-optic pressure sensor system for gas turbine ngine control p 857 A92-48047 WESTWATER, E. R.

Remote measurements of supercooled integrated liquid water during WISP/FAA aircraft icing program

p 915 A92-46788 WHEATON, D. G.

Robust discrete controller design for an unmanned research vehicle (URV) using discrete quantitative feedback theory p 877 A92-48495

WHITAKER, KEVIN W.

Specifying exhaust nozzle contours in real-time using genetic algorithm trained neural networks p 865 A92-48911

[AIAA PAPER 92-3328] WHITE, A. D.

Initial validation of a R/D simulator with large amplitude p 886 N92-28546

WHITE, D. R.

Prediction and measurement of jet flowfield features for ASTOVL aircraft

WHITE, MICHEAL J. Operational noise data for OH-58D Army helicopters

AD-A246822] p 926 N92-28292 WHITEHURST, R. B., III

KrF laser-induced OH fluorescence imaging in a supersonic combustion tunnel I AIAA PAPER 92-33461

p 905 A92-48923 WHITFIELD, DAVID

Investigation of solution operators for the three-dimensional Euler equations

[AIAA PAPER 92-2666] p 797 A92-45522 WHITING, ELLIS E.

Decoupled predictions of radiative heating in air using a particle simulation method

[AIAA PAPER 92-2971] p 816 A92-46986 WHITMAN, GARY Scenario analysis of thigh gap related ejection injuries

WIESEMAN, CAROL

On-line performance evaluation of multiloop digital control systems p 873 A92-46739

WIETING, ALLAN R.

Multiple shock-shock interference on a cylindrical leading edge p 813 A92-46899

WILKINSON, T.

Emerging airframe/propulsion integration technologies at General Electric

(AIAA PAPER 92-33351

p 850 A92-48917 WILLIAMS, BEN R.

Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept

p 860 A92-45316 WILLIAMS, D. D.

Hot-gas reingestion - Engine response considerations

WILLIAMS, GEORGE M., JR. A high-performance LLLTV CCD camera for nighttime p 855 A92-46227

pilotage

WILLIAMS, M. H. Temporal adaptive Euler/Navier-Stokes algorithm

involving unstructured dynamic meshes p 812 A92-46887

p 860 A92-45317

p 834 A92-44995

WILLIAMS, MARC H.

Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoits unstructured meshes

[AIAA PAPER 92-2694] p 800 A92-45540 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes

INASA-TM-1076351 WILLIAMS, MARK J.

Military utility of medium speed V/STOL designs

p 841 A92-45308 WILLIAMS, ROY Adaptive parallel meshes with complex geometry

WILLIAMSON, JAMES S.

Expert Avionics Code Modification

p 921 A92-48513

p 813 A92-46901

p 918 A92-47050

p 831 N92-29445

WILMOTH, R. G. Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840

WILSON, ANTHONY Drop test: Cessna Golden Eagle 421B

p 837 N92-28900 [DOT/FAA/CT-TN91/32] WILSON, DONALD R.

Experimental investigation of the parallel vortex-airfoil interaction at transonic speeds

B-25

WILSON, JOHN C. Helicopter low-speed yaw control [NASA-CASE-LAR-14219-1] p 879 N92-30025 WILSON, W. W. Laser velocimetry measurements in an MHD aerodynamic duct [AIAA PAPER 92-2986] p 899 A92-46996 WINFREE, WILLIAM P. Thermal QNDE detection of airframe disbonds p 914 N92-30118 WINKELMANN, ALLEN E. Studies in general aviation aerodynamics [NASA-CR-190431] p 827 N92-28511 WINTER, M. Eigenfunction analysis of turbulent mixing phenomena WIRYOHADIATMOJO, E. S. L. H. system theoretical approaches, and their applications to

p 898 A92-45826 Inverse control problems: Mathematical preliminaries,

aircraft dynamics ILR-6651 p 923 N92-28581 WISE, KEVIN A.

Comparison of six robustness tests evaluating missile autopilot robustness to uncertain aerodynamics p 873 A92-46737

WISHART, D. The enhancement of mixing in high-speed heated jets using a counterflowing nozzle

[AIAA PAPER 92-3262] p 825 A92-48857 WISNOM, MICHAEL R.

The relationship between tensile and flexural strength p 891 A92-45629 of unidirectional composites

DLR research reports and communications

[ETN-92-91391] p 929 N92-29218 Aerothermodynamic calculations for the Space Shuttle

Orbiter [AIAA PAPER 92-2953] p 821 A92-47917

WONG, JIM L. Computations of hypersonic flows around a three-dimensional concave/convex body p 805 A92-45570 [AIAA PAPER 92-2606]

WONG, KA-KHA Integrated optic components for advanced turbine p 925 A92-46248 engine control systems

WOOD, N. B. Experience with the Johnson-King turbulence model in

a transonic turbine cascade flow solver p 821 A92-48207

WOOD, RICHARD M.

Natural flow wing [NASA-CASE-LAR-14281-1] p 829 N92-28729 WOODFIELD, A. A.

Validation of simulation systems for aircraft acceptance p 852 N92-28531

WOODWARD, RICHARD P.

Noise of two high-speed model counter-rotation propellers at takeoff/approach conditions

p 925 A92-46799 WRENN, GREGORY A. Integrating aerodynamics and structures in the minimum

weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 WÙ. C.

A computational study of advanced exhaust system transition ducts with experimental validation [AIAA PAPER 92-3794] p 907 A92-49126

WIL HU

A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial compressor cascades p 819 A92-47691 WU, TIN-JUEI

Numerical study on a supersonic open cavity flow with geometric modification of aft bulkhead

[AIAA PAPER 92-2627] p 794 A92-45499 WU, ZHE

Optimal maintenance program of damage tolerance structure p 785 A92-47660

X

XING, DING-DING

An improved multiple line-vortex method for simulation of separated vortices of slender wings p 819 A92-47694

XIONG, JUN-JIANG A study on crack initiation method for durability

analysis p 901 A92-47663 XU, MING-CHU

Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695 **XU. ZHONG**

A failure analysis for landing gear structural system p 849 A92-47667 YADLIN, YORAM

Parallel computing strategies for block multigrid implicit p 812 A92-46894 solution of the Euler equations

YAMAGUCHI, ISAO

Quaternion and Euler angles in kinematics p 909 N92-28836 INAL-TM-6361

YAMAMOTO, K.

Conceptual study of separated core ultra high bypass engine [AIAA PAPER 92-3775] p 867 A92-49119

YAMAMOTO, SATORU

A higher-order accurate Navier-Stokes solver for transonic and supersonic flows in turbomachinery I AIAA PAPER 92-3044 I p 822 A92-48704

YAMATO, HIDEYUKI Functional mock-up tests for flight control system of the

NAL OSTOL research aircraft 'ASKA' p 881 A92-45422 [SAE PAPER 912036]

YANAGIHARA, MASAAKI

Estimation of spaceplane lateral-directional stability and control derivatives from dynamic wind tunnel test **ISAF PAPER 9119791** n 872 A92-45384

YANG. H.

Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 YANG, J. N.

Reliability centered maintenance for metallic airframes based on a stochastic crack growth approach p 897 A92-45242

YAO, J.

Microburst modelling and scaling p 915 A92-46262 YASU, SHOUHACHI

Experimental validation scramjet nozzle performance [AIAA PAPER 92-3290] p 864 A92-48879

YASUHARA, MICHIRU Flow field around thick delta wing with rounded leading

(SAF PAPER 912009) p 789 A92-45409 Shock interaction induced by hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427

YATES, LESLIE A.

Streamlines, vorticity lines, and vortices around three-dimensional bodies p 808 A92-45845

YONGHU, WENREN

An Eulerian/Lagrangian method for blade/vortex impingement p 814 A92-46952

YOO, KYUNG M.

Prediction of rotor unsteady airloads using vortex filament theory [AIAA PAPER 92-2610] p 792 A92-45484

YORK, B. J.

Progress towards the development of transient ram accelerator simulation as part of the U.S. Air Force Armament Directorate Research Program p 904 A92-48847 [AIAA PAPER 92-3248]

YOSHIDA, KENJI

Experimental and numerical study of aerodynamic characteristics for second generation SST p 844 A92-45439 [SAE PAPER 912056]

YOSIBASH, ZOHAR

Structural risk assessment in the Israel Air Force for fleet management p 836 A92-46779

YOUNG, CLARENCE P., JR.

Buffet test in the National Transonic Facility p 888 N92-29352 INASA-CR-1895951

YOUNG, T. W.

A new approach for the calculation of transitional flows

[AIAA PAPER 92-2669] p 798 A92-45524

Transonic airfoil and wing design using Navier-Stokes codes [AIAA PAPER 92-2651] p 797 A92-45518

YU. Q. A new vane swirler as applied to dual-inlet side-dump

combustor 1AIAA PAPER 92-36541 p 906 A92-49085

YU. SHU-KUI

Research of environmental spectrum for aircraft p 785 A92-47655

YUHAS, ANDREW J.

Effects of bleed air extraction on thrust levels on the F404-GE-400 turbofan engine INASA-TM-1042471 p 871 N92-29425 ZACCARIA, M.

Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility

Z

p 883 A92-48908 [AIAA PAPER 92-3325] Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. II - Three-dimensional flow field at the exit of the nozzle

[AIAA PAPER 92-3326] p 826 A92-48909 ZAFF, BRIAN S.

Identifying design requirements using integrated analysis

p 922 A92-48527 structures ZAKRENT, ANDRZEJ

Radioaltimeter RWL-750 p 855 A92-45374

ZAMAN, K. B. M. Q.

Experimental investigation of the flowfield of an oscillating airfoil

[AIAA PAPER 92-2622] p 793 A92-45494 Supersonic jet mixing enhancement by 'delta-tabs' p 826 A92-49063 [AIAA PAPER 92-3548] Experimental investigation of the flowfield of an oscillating airfoil

[NASA-TM-105675] p 833 N92-30182

ZARIANKIN, ARKADII E.

Total losses in turbulent flows inside conical diffusers p 819 A92-47782

ZARIFI-RAD, F.

Effect of model cooling on periodic transonic flow p 813 A92-46900

ZEMBOWER, ANDY

Autonomous landing - Functional requirements

p 840 A92-48470

ZETZI LARRY

Rapid systems integration of navigation avionics p 858 A92-48473

ZHA, GE-CHENG

Effect of throat contouring on two-dimensional converging-diverging nozzles using URS method p 797 A92-45520

I AIAA PAPER 92-26591 ZHANG FU-ZE

The fatique scatter factors and reduction factors in the design of aircraft and helicopter's structural lives p 843 A92-45387 [SAE PAPER 911984]

ZHANG, JIA-ZHEN

Study on two variable control plan for twin spool turboiet p 862 A92-47697 engine

Improved method for estimation of the maximum instantaneous distortion values

[AIAA PAPER 92-3623] p 826 A92-49076

ZHANG, SHAOJI

A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904

ZHANG, SHU-CHENG

A time marching method in finite volume for transonic diffuser turbulent flows p 819 A92-47690 ZHANG, WEI

Probability analysis of structure failure for the wings with main and subordinate components p 848 A92-47657 ZHANG, XIU-YI

Sonic fatique analysis and anti-sonic fatique design of aircraft structure p 848 A92-47666 ZHAO, KEYUN

An experimental investigation on aft bypass supersonic inlet performance at high angle of attack and yaw p 862 A92-48268

ZHAO. YIYUAN

Approach guidance in a downburst

p 873 A92-46741

ZHENG, Y.

LDV measurements in the three-dimensional near wake of a stationary and oscillating rectangular wind I AIAA PAPER 92-26891 p 799 A92-45536

Viscous effects on a vortex wake in ground effect [NASA-CR-190400] p 907 N92-28361 ZHOU, JIAN-SHENG

Approximate analysis for failure probability of structural

systems p 901 A92-47671 ZHOU, XI-YUAN Research of environmental spectrum for aircraft

structure p 785 A92-47655 Ablative control mechanism in nozzle

thermo-protection

[AIAA PAPER 92-3054] p 889 A92-48712

ZHUANG, FENG-GAN

An improved multiple line-vortex method for simulation of separated vortices of slender wings

p 819 A92-47694

ZIPF, EDWARD C. Examination of ultraviolet radiation theory for bow shock Examination of ultravioles recorded experiments

[AIAA PAPER 92-2871] p 901 A92-47853

ZLOCKA, MARIA

Aircraft stabilization at large angles of attack

p 875 A92-47785

ZOBY, ERNEST V.
Enhancements to viscous-shock-layer technique
[AIAA PAPER 92-2897] p 820 A92-47873

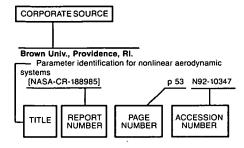
ZUBAIR, M.

Solutions of acoustic field problems using parallel computers

p 925 A92-45929

SOURCE

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

Advisory Group for Aerospace Research and

Development, Neuilly-Sur-Seine (France). Applications of ASICs to avionics p 859 N92-28376 IAGARD-AG-3291 Steady and Transient Performance Prediction of Gas Turbine Engines p 868 N92-28458 [AGARD-LS-183] Aircraft ship operations
[AGARD-AR-312] p 850 N92-28468 Integrated Design Analysis and Optimisation of Aircraft [AGARD-LS-186] p 851 N92-28469 Piloted Simulation Effectiveness (AGARD-CP-513) p 786 N92-28522

Aeritalia S.p.A., Naples (Italy).

Boundary conditions for Euler equations at internal block faces of multi-block domains using local grid refinement [NLR-TP-90134-U] p 908 N92-28712

Aeronautical Research Labs., Melbourne (Australia). Reduction and analysis of F-111C flight data p 853 N92-28771 IAD-A2503411

Aeronautical Systems Div., Wright-Patterson AFB, OH. Damage tolerance for commuter aircraft

p 914 N92-30114

Aerospatiale, Toulouse (France)

Flight simulation and digital flight controls p 884 N92-28526

Air Force Flight Test Center, Edwards AFB, CA.

Utility of ground simulation in flight control problem identification, solution development, and verification p 883 N92-28525

Use of simulation in the USAF Test Pilot School p 884 N92-28535

Air Force Inst. of Tech., Wright-Patterson AFB, OH. Life cycle costs of the C-130 electrical power system upgrade [AD-A246759] p 786 N92-28348

Modular simulation of HEI fragments and blast nressure [AD-A248205] p 910 N92-29191 Development of a flight information system using the structured method p 859 N92-29222 IAD-A2482071 Airbus Industrie, Blagnac (France). Ageing airplane repair assessment program for Airbus p 838 N92-30123 A300 Alenia, Torino (Italy). AM-X flight simulator from engineering tool to training device p 884 N92-28536 Anacapa Sciences, Inc., Fort Rucker, AL. Assessment of army aviators' ability to perform individual and collective tasks in the aviation networked simulator p 888 N92-29709 [AD-A250293]

Arizona Univ., Tucson Expand turbulence laboratory facilities to meet new DOD research interest

[AD-A248581] p 883 N92-28388 Army Construction Engineering Research Lab.,

Champaign, IL.

Operational noise data for OH-58D Army helicopters [AD-A246822] p 926 N92-28292 Army Engineer Waterways Experiment Station,

Vicksburg, MS. Passive acoustic range estimation of helicopters (AD-A2480331 p 926 N92-28302

Army Lab. Command, Watertown, MA. A sensitivity analysis on component reliability from fatigue life computations [AD-A247430] p 908 N92-28425

В

Battelle Memorial Inst., Columbus, OH.

Generation of spectra and stress histories for fatigue and damage tolerance analysis of fuselage repairs [AD-A250390] p 854 N92-29180

Boeing Co., Seattle, WA.

Buffet test in the National Transonic Facility NASA-CR-189595 | p 888 N92-29352 [NASA-CR-189595] Boeing Commercial Airplane Co., Seattle, WA.

Structural integrity of future aging airplanes

p 913 N92-30107 Performance of fuselage pressure structure p 913 N92-30109

British Aerospace Public Ltd. Co., Lancashire

Effective cueing during approach and touchdown: Comparison with flight p 886 N92-28552 Brown Univ., Providence, RI.

Parameter identification for nonlinear aerodynamic [NASA-CR-190264] p 830 N92-29329

CAE Electronics Ltd., Montreal (Quebec).

The use of a dedicated testbed to evaluate simulator training effectiveness p 884 N92-28533 CAE Electronics Ltd., Saint Laurent (Quebec).

The evaluation of simulator effectiveness for the training

of high speed, low level, tactical flight operations p 885 N92-28539

California Inst. of Tech., Pasadena. Shock enhancement and control of hypersonic combustion

[AD-A248558] p 896 N92-29580 California Polytechnic State Univ., San Luis Obispo. Computation of three-dimensional effects on two dimensional wings

INASA-CR-190576 I Cambridge Univ. (England).

Inlet distortion effects in aircraft propulsion system p 869 N92-28464 integration Boundary layer induced noise in aircraft [CUED/A-AERO/TR-18] p 927 N92-29201

p 832 N92-29691

Carleton Univ., Ottawa (Ontario).

Overview on basis and use of performance prediction p 869 N92-28459 Component performance requirements

p 869 N92-28462

Chemical Research and Development Center. Aberdeen Proving Ground, MD.

Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Branch AD-A2474891 p 883 N92-28248

Civil Aviation Authority, Canberra (Australia).

Aging commuter aeroplanes: Fatigue evaluation and p 915 N92-30132 control methods

Cranfield Inst. of Tech., Bedford (England). Fundamentals of structural optimisation

p 851 N92-28470

D

Dassault (E. M.) Co., Saint Cloud (France).

Structural optimization of aircraft p 851 N92-28472 Dassault-Breguet Aviation, Saint Cloud (France).

The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544

Dayton Univ., OH. Lubricant evaluation and performance 2

[AD-A247464] p 895 N92-28398

Defence Research Agency, Bedford (England).

Initial validation of a R/D simulator with large amplitude p 886 N92-28546 motion

Department of the Navy, Washington, DC.

Multi-channel fiber optic rotary joint for single-mode [AD-D015273] p 927 N92-29095

Department of Transport, Ottawa (Ontario).

Transport Canada aging aircraft activities p 838 N92-30131

Deutsche Airbus G.m.b.H., Hamburg (Germany, F.R.). Use of a virtual cockpit for the development of a future transport aircraft p 886 N92-28547

Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.).

The role of systems simulation for the development and qualification of ATTAS p 886 N92-28548 Sensor fault detection on board an aircraft with observer and polynomial classifier

[DLR-FB-91-34] p 859 N92-29870 Jet aircraft noise at high subsonic flight Mach numbers

[DLR-FB-91-28] p 928 N92-29997

Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.).

DLR research reports and communications p 929 N92-29218 [ETN-92-91391]

Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.).

Global and high resolution radar cross section measurements and two-dimensional microwave images of

a scaled aircraft model from the type Airbus A 310 p 911 N92-29877 IDLR-MITT-91-101 DieselDyne Corp., Morrow, OH.

A preliminary design and analysis of an advanced

heat-rejection system for an extreme altitude advanced variable cycle diesel engine installed in a high-altitude advanced research platform [NASA-CR-186021] p 871 N92-29427

Douglas Aircraft Co., Inc., Long Beach, CA.

The use and effectiveness of piloted simulation in transport aircraft research and development

p 886 N92-28549 Maintaining the safety of an aging fleet of aircraft p 837 N92-30108

Inspection of aging aircraft: A manufacturer's p 914 N92-30117 perspective

Ε

European Space Agency, Paris (France).

Calculation of support interferences on the aerodynamic coefficients for a wind tunnel calibration model p 830 N92-29159 IESA-TT-1247 I

Federal Aviation Administration, Atlantic City, NJ.

Drop test: Cessna Golden Eagle 421B p 837 N92-28900 [DOT/FAA/CT-TN91/32] Federal Aviation Administration aging aircraft nondestructive inspection research plan

p 914 N92-30116

Federal Aviation Administration, Cambridge, MA.

Current DOT research on the effect of multiple site p 913 N92-30112 damage on structural integrity

Federal Aviation Administration, Seattle, WA.

Status of the FAA flight loads monitoring program p 914 N92-30113

The FAA aging airplane program plan for transport p 838 N92-30128

Federal Aviation Administration, Washington, DC.

FAA aviation forecasts [AD-A250412]

p 837 N92-29182

Federal Express Corp., Memphis, TN.

Communication: An important element of maintenance p 838 N92-30124 and repair Federal Ministry for Defence, Bonn (Germany, F.R.). Opportunities for flight simulation to improve operational p 883 N92-28523 effectiveness

G

GasTOPS Ltd., Gloucester (Ontario).

Engine performance and health monitoring models using steady state and transient prediction methods

p 870 N92-28467

General Electric Co., Gilbert, AZ.

Transport delay measurements: Methodology and analysis for the F-16C combat engagement trainer, the display for advanced research and training, and the F-16A limited field of view IAD-A2485191 p 888 N92-29505

Н

Harvard Univ., Cambridge, MA.

Preliminary results on the fracture analysis of multi-site cracking of lap joints in aircraft skins

p 913 N92-30111

lowa State Univ. of Science and Technology, Ames. NDE research efforts at the FAA Center for Aviation p 914 N92-30119 Systems Reliability

J

Jet Propulsion Lab., California Inst. of Tech.,

Pasadena.

Microwave temperature profiler for clear air turbulence

[NASA-CASE-NPO-18115-1-CU] p 916 N92-29148

Kansas Univ. Center for Research, Inc., Lawrence.

Identification of aerodynamic models for maneuvering p 852 N92-28720

[NASA-CR-190444]

М

Manchester Univ. (England).

Aeronautical Engineering Group publications, 1950 present

[AERO-REPT-8907] p 910 N92-29683

Maryland Univ., College Park.

Studies in general aviation aerodynamics p 827 N92-28511 [NASA-CR-190431]

Massachusetts Inst. of Tech., Cambridge.

Dynamic control of aerodynamic instabilities in gas p 870 N92-28466 turbine engines

MCAT Inst., San Jose, CA.

Study of optical techniques for the Ames unitary wind tunnels. Part 3: Angle of attack [NASA-CR-190541] p 888 N92-29655

McDonnell-Douglas Corp., Long Beach, CA. Evaluation of outdoor-to-indoor response to minimized

sonic booms [NASA-CR-189643]

p 927 N92-28556

McDonnell-Douglas Helicopter Co., Mesa, AZ.

The application of flight simulation models in support of rotorcraft design and development

p 884 N92-28527

Mei Associates, Inc., Lexington, MA.

Design specifications for the Advanced Instructional Design Advisor (AIDA), volume 2

[AD-A248202] n 923 N92-29188 Messerschmitt-Boelkow-Blohm G.m.b.H., Munich

(Germany, F.R.).

Practical architecture of design optimisation software for aircraft structures taking the MBB-Lagrange code as an p 851 N92-28471 Mathematical optimization: A powerful tool for aircraft

p 851 N92-28474 desian Experience with piloted simulation in the development of helicopters p 884 N92-28528

Saenger: The reference concept and its technological requirements - aerothermodynamics

[MBB-FE-202-S-PUB-0463-A] p 890 N92-29629 Technology programme: Aerothermodynamics and propulsion integration. Numerical and experimental aerothermodynamics

[MBB-FE-202-S-PUB-0464-A] p 831 N92-29648 Aerothermodynamics and propulsion integration in the Saenger technology programme

IMBB-FE-202-S-PUB-0469-A1 p 831 N92-29649 Concurrent engineering in design of aircraft structures [MBB-FE-2-S-PUB-472] p 854 N92-29650 Aerothermodynamic challenges of the Saenger space-transportation system

[MBB-FE-202-S-PUB-0462-A] p 890 N92-29680 Hypersonic flow past radiation-cooled surfaces

[MBB-FE-202-S-PUB-0468-A] p 832 N92-29713 Computed Tomography (CT) as a nondestructive test

method used for composite helicopter components p 910 N92-29873 [MBB-UD-0603-91-PUB] Repair procedures for advanced composites for heliconters

[MBB-UD-0606-91-PUB] p 787 N92-29874 Experience with piloted simulation in the development of heliconters

p 889 N92-30076 [MBB-UD-0610-91-PUB] Acquisition of an aerothermodynamic data base by means of a winged experimental reentry vehicle

[MBB/FE202/S/PUB/461] p 787 N92-30232 Micro Circuit Engineering Ltd., Tewkesbury (England). Applications of silicon hybrid multi-chip modules to p 859 N92-28379 avionics

Ministry of Defence, London (England). Harrier GR MK 5/7 mission simulators for the Royal p 885 N92-28540 Air Force

Minnesota Univ., Minneapolis.

Feedback control laws for highly maneuverable aircraft [NASA-CR-190535] p 879 N92-29654

N

National Aeronautics and Space Administration,

Washington, DC.

Who or what saved the day? A comparison of traditional and glass cockpits p 833 A92-44931 p 833 A92-44931 Empirical foundations and sensitivity testing - Is it enough for the 90's? p 835 A92-45054 Computational aerodynamics - The next generation [SAE PAPER 911988] p 788 A92-45390 A nonlinear relaxation/quasi-Newton algorithm for the compressible Navier-Stokes equations

I AIAA PAPER 92-26431 p 796 A92-45510 Multi-point inverse design of an infinite cascade of airfoils

1AIAA PAPER 92-26501 p 797 A92-45517 A new approach for the calculation of transitional

p 798 A92-45524 I AIAA PAPER 92-26691 Numerical simulations using a dynamic solution-adaptive

grid algorithm, with applications to unsteady internal

[AIAA PAPER 92-2719] p 803 A92-45557 Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431 Airdata calibration techniques for measuring atmospheric wind profiles p 856 A92-46792 Wind-tunnel compressor stall monitoring using neural p 918 A92-46817 networks Computation of turbulent, unswept

separated, p 813 A92-46897 compression ramp interactions Unstructured and adaptive mesh generation for high Reynolds number viscous flows p 816 A92-47042

Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835

Fiber optic and laser sensors VIII; Proceedings of the Meeting, San Jose, CA, Sept. 17-19, 1990

p 901 A92-48026 I SPIE-13671 Comparative study of turbulence models in predicting hypersonic inlet flows

[AIAA PAPER 92-3098] p 824 A92-48740

Advanced Rotorcraft Transmission (ART) Program summary

| AIAA PAPER 92-3365 | p 905 A92-48938 Experiments on the enhancement of compressible mixing via streamwise vorticity. I - Optical measurements [AIAA PAPER 92-3549] p 906 A92-49064

NASA engineers and the age of Apollo [NASA-SP-4104] p 929 N92-28344 National Aeronautics and Space Administration. Ames

Research Center, Moffett Field, CA. Who or what saved the day? A comparison of traditional p 833 A92-44931 and glass cockpits

A re-analysis of the causes of Boeing 727 'black hole p 833 A92-44985 landing' crashes Jet-powered V/STOL aircraft - Lessons learned

p 841 A92-45304 Large-scale wind tunnel studies of a jet-engined powered ejector-lift STOVL aircraft p 842 A92-45313 p 842 A92-45313

Integrated flight/propulsion control for supersonic STOVL aircraft p 872 A92-45320 Effect of canard deflection on close-coupled

canard-wing-body aerodynamics IAJAA PAPER 92-26021 p 792 A92-45479 High speed aerodynamics of upper surface blowing

aircraft configurations [AIAA PAPER 92-2611] p 793 A92-45485

Future directions in computing and CFD p 917 A92-45489 (AIAA PAPER 92-2734)

Coupled numerical simulation of the external and engine inlet flows for the F-18 at large incidence

[AIAA PAPER 92-2621] p 793 Practical design optimization of wing/body configurations using the Euler equations

IAIAA PAPER 92-2633] p 795 A92-45505 Vortex trapping on a 60 degree delta wing

[AIAA PAPER 92-2639] p 796 A92-45508 Numerical investigation of tail buffet on F-18 aircraft [AIAA PAPER 92-2673] p 798 A92-45528

Analysis of a pneumatic forebody flow control concept about a full aircraft geometry [AIAA PAPER 92-2678]

p 799 A92-45530 Computational evaluation of an airfoil with a Gurney [AIAA PAPER 92-2708] p 802 A92-45550

Forebody vortex control for suppressing wing rock on a highly-swept wing configuration [AIAA PAPER 92-2716] p 803 A92-45555

Navier-Stokes computation of wing leading edge tangential blowing for a tilt rotor in hover [AIAA PAPER 92-2608] p 805 A92-45568

Forebody flow control on a full-scale F/A-18 aircraft [AIAA PAPER 92-2674] p 806 A92-45583 Full-scale high angle-of-attack tests of an F/A-18 [AIAA PAPER 92-2676] p 806 A92-45584

Streamlines, vorticity lines, and vortices around p 808 A92-45845 p 915 A92-46262 three-dimensional bodies Microburst modelling and scaling Parameter identification of linear systems based on p 873 A92-46742 smoothing

Navier-Stokes predictions for the F-18 wing and fuselage t large incidence p 810 A92-46783 at large incidence Navier-Stokes computations on swept-tapered wings, cluding flexibility p 810 A92-46786 Experimental study of vortex flows over delta wings in including flexibility

p 810 A92-46787 ing-rock motion Forebody vortex control using small, rotatable strakes p 811 A92-46798

Self-induced roll oscillations of low-aspect-ratio rectangular wings n 874 A92-46802 Wind-tunnel compressor stall monitoring using neural networks p 918 A92-46817

Interaction between crossing oblique shocks and a irbulent boundary layer p 812 A92-46882 turbulent boundary layer Parallel computing strategies for block multigrid implicit solution of the Euler equations p 812 A92-46894 A general purpose nonlinear rigid body mass finite element for application to rotary wing dynamics

D 846 A92-46924 A study of rotor wake development and wake/body interactions in hover p 813 A92-46935 On the adequacy of modeling turbulence and related effects on helicopter response p 847 A92-46945 d for computing p 814 A92-46952 An Eulerian/Lagrangian method for blade/vortex impingement Three-dimensional blade vortex interactions

p 815 A92-46953 Experimental and computational studies of hovering p 815 A92-46954

Decoupled predictions of radiative heating in air using a particle simulation method [AIAA PAPER 92-2971] p 816 A92-46986 Nonlinear control design for slightly nonminimum phase systems - Application to V/STOL aircraft

p 876 A92-48160

Aerodynamic performance of a full-scale lifting ejector system in a STOVL fighter aircraft [AIAA PAPER 92-3094] p 824 A92-48738 High speed rotorcraft propulsion concepts to control power/speed characteristics p 865 A92-48940 [AIAA PAPER 92-3367] Analysis of a hydrocarbon scramjet with augmented preburnina p 865 A92-48984 (AIAA PAPER 92-3425) Comparison of three controllers applied to helicopter vibration p 878 N92-28457 Thermal response of rigid and flexible insulations and reflective coating in an aeroconvective [NASA-TM-103925] p 852 N92-28721 The design of test-section inserts for higher speed aeroacoustic testing in the Ames 80- by 120-foot wind tunnel p 927 N92-28909 [NASA-TM-103915] Binary optical filters for scale invariant pattern recognition [NAŠA-TM-103902] p 853 N92-28910 Rotorcraft In-Flight Simulation Research at NASA Ames Research Center: A Review of the 1980's and plans for [NASA-TM-103873] o 853 N92-28926 A rotorcraft flight database for validation of vision-based ranging algorithms INASA-TM-1039061 p 841 N92-29103 Performance of uncoated AFRSI blankets during multiple Space Shuttle flights [NASA-TM-103892] p 890 N92-29104 Improving designer productivity p 854 N92-29417 [NASA-TM-103929] NASA Workshop on future directions in surface modeling and grid generation [NASA-CP-10092] p 831 N92-29625 National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD. Superconducting bearings with levitation configurations
[NASA-CASE-GSC-13346-1] p 909 N92-29099 National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA. In-flight simulation studies at the NASA Dryden Flight p 853 N92-29110 [NASA-TM-4396] National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Facility, Edwards, CA. p 880 A92-45266 Water tunnels Update of the X-29 high-angle-of-attack program p 783 A92-45407 [SAE PAPER 912006] Airdata calibration techniques atmospheric wind profiles p for measuring p 856 A92-46792 Summary of the effects of engine throttle response on airplane formation-flying qualities
[AIAA PAPER 92-3318] p 877 A92-48902 Subsonic flight test evaluation of a performance seeking control algorithm on an F-15 airplane [AIAA PAPER 92-3743] p 878 A92-49109 Subsonic flight test evaluation of a propulsion system parameter estimation process for the F100 engine
[AIAA PAPER 92-3745] p 866 A92p 866 A92-49110 Thrust stand evaluation of engine performance improvement algorithms in an F-15 airplane p 866 A92-49111 [AIAA PAPER 92-3747] Effects of bleed air extraction on thrust levels on the F404-GE-400 turbofan engine p 871 N92-29425 [NASA-TM-104247] Flight evaluation of an extended engine life mode on an F-15 airplane p 871 N92-29659 [NASA-TM-104240] National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX. Space Shuttle Orbiter auxiliary power unit status [SAE PAPER 912060] p 889 A92 p 889 A92-45442 Bearing servicing tool
[NASA-CASE-MSC-21881-1] p 912 N92-30082 National Aeronautics and Space Administration. Langley Research Center, Hampton, VA. High-Reynolds-number test requirements in low-speed p 787 A92-45263 aerodynamics On the measurement of subsonic flow around an appended body of revolution at cryogenic conditions in p 880 A92-45265 the NTF Critical effects of downstream boundary conditions on vortex breakdown p 792 A92-45478 [AlAA PAPER 92-2601] The effects of nozzle exit geometry on forebody vortex control using blowing [AIAA PAPER 92-2603] p 792 A92-45480 Numerical simulation of aerothermal loads in hypersonic

engine inlets due to shock impingement

[AIAA PAPER 92-2605]

p 792 A92-45482

Computational study of transition front on a swept wing leading-edge model [AIAA PAPER 92-2630] p 795 A92-45502 Transonic airfoil and wing design using Navier-Stokes |AIAA PAPER 92-2651| p 797 A92-45518 A new approach for the calculation of transitional p 798 A92-45524 1AIAA PAPER 92-26691 Determination of aerodynamic sensitivity coefficients based on the three-dimensional full potential equation p 798 A92-45525 [AIAA PAPER 92-2670] An adaptive grid method for computing the high speed 3D viscous flow about a re-entry vehicle (AIAA PAPER 92-2685) p 799 A92-45534 LDA measurements in a Mach 2 flow over a rearward facing step with staged transverse injection [AIAA PAPER 92-2692] p.800 p 800 A92-45539 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes IAIAA PAPER 92-26941 p 800 A92-45540 Commercial turbofan engine exhaust nozzle flow analyses using PAB3D [AIAA PAPER 92-2701] p 801 A92-45543 Alleviation of side force on tangent-ogive forebodies using passive porosity p 802 A92-45552 [AIAA PAPER 92-2711] A LEX blowing technique for post-stall lateral control of trapezoidal wings [AIAA PAPER 92-2714] p 802 A92-45553 Viscous flow past a nacelle isolated and in proximity of a flat plate p 803 A92-45560 [AIAA PAPER 92-2723] Separation control on high Reynolds number multi-element airfoils p 806 A92-45575 [AIAA PAPER 92-2636] Exploratory investigation of a spanwise blowing concept for tip-stall control on cranked-arrow wings [AIAA PAPER 92-2637] p 806 An investigation of passive control methods for shock-induced separation at hypersonic speeds (AIAA PAPER 92-2725) p 808 A92-45596 Measurements of the unsteady vortex flow over a wing-body at angle of attack [AIAA PAPER 92-2729] p 808 A92-45598 prediction High-speed propeller multidisciplinary approach p 924 A92-45831 Relationship between the instability waves and noise of high-speed jets p 924 A92-45835 Aerothermodynamics of a 1.6-meter-diameter sphere in hypersonic rarefied flow p 808 A92-45840 The effect of molecular relaxation processes in air on the rise time of sonic booms p 898 A92-45883 Discrete modes and continuous spectra in supersonic p 809 A92-46264 boundary layers On-line performance evaluation of multiloop digital control systems p 873 A92-46739 Nonlinear inversion control for p 873 A92-46751 supermaneuverable aircraft Temporal adaptive Euler/Navier-Stokes algorithm involving unstructured dynamic meshes p 812 A92-46887 Hypersonic rarefied flow about a delta wing - direct simulation and comparison with experiment p 812 A92-46892 Multiple shock-shock interference on a cylindrical leading edge p 813 A92-46899 Gortler instability and supersonic quiet nozzle design p 813 A92-46902 Periodic trim solutions with hp-version finite elements time p 874 A92-46931 in time An aeroelastic analysis with a generalized dynamic wake p 847 A92-46932 Efficient high-resolution rotor wake calculations using flow field reconstruction p 814 A92-46951 Effects of leading and trailing edge flaps on the aerodynamics of airfoil/vortex interactions p 815 A92-46957 Aerodynamic parametric studies and sensitivity analysis p 816 A92-46959 for rotor blades in axial flight A parametric analysis of radiative structure in aerobrake shock lavers [AIAA PAPER 92-2970] p 816 A92-46985 Unstructured and adaptive mesh generation for high Reynolds number viscous flows p 816 A92-47042 Grid adaptation to multiple functions for applied p 817 A92-47045 aerodynamic analysis Gridding strategies and associated results for winged p 918 A92-47051 entry vehicles Grid generation and compressible flow computations about a high-speed civil transport configuration n 919 A92-47055 Sensitivity of tire response to variations in material and geometric parameters p 900 A92-47128

Analysis of thermo-chemical nonequilibrium models for carbon dioxide flows [AIAA PAPER 92-2852] p 892 A92-47835 Enhancements to viscous-shock-layer technique [AIAA PAPER 92-2897] p 820 A92-47873 Heat transfer characteristics of hypersonic waveriders with an emphasis on leading edge effects [AIAA PAPER 92-2920] p 821 A92-47892 Characteristics of the Shuttle Orbiter leeside flow during a reentry condition [AIAA PAPER 92-2951] Thrust vectoring characteristics of the F-18 high alpha research vehicle at angles of attack from 0 to 70 deg [AIAA PAPER 92-3095] p 877 A92-48737 Internal shock interactions in propulsion/airframe integrated three-dimensional sidewall compression scramjet inlets [AIAA PAPER 92-3099] AIAA PAPER 92-3099] p 824 A92-48741 Operating characteristics at Mach 4 of an inlet having forward-swept, sidewall-compression surfaces [AIAA PAPER 92-3101] p 863 A92-48743 High spatial resolution measurements of ram accelerator as dynamic phenomena [AIAA PAPER 92-3244] p 903 A92-48844 Mixing and combustion effects in a sliding-wedge ram accelerator with hydrogen injection [AIAA PAPER 92-3251] n 890 A92-48849 Comparative investigation of multiplane thrust vectoring [AIAA PAPER 92-3263] p 864 A92-48858 A comparative study of scramjet injection strategies for high Mach numbers flows [AIAA PAPER 92-3287] p 904 A92-48876 KrF laser-induced OH fluorescence imaging in a supersonic combustion tunnel (AIAA PAPER 92-3346) p 905 A92-48923 Experiments on the enhancement of compressible mixing via streamwise vorticity. I - Optical measurements [AIAA PAPER 92-3549] p 906 A92-49064 Ignition delays, heats of combustion, and reaction rates of aluminum alkyl derivatives used as ignition and combustion enhancers for supersonic combustors [AIAA PAPER 92-3841] p 894 A92-49134 An analysis of combustion studies in shock expansion tunnels and reflected shock tunnels [NASA-TP-3224] p 895 N92-28374 Integrating aerodynamics and structures in the minimum weight design of a supersonic transport wing [NASA-TM-107586] p 850 N92-28435 Multidisciplinary design and optimization [AGARD-PAPER-2] p 851 N92-28473 Calculation of unsteady transonic flows with mild separation by viscous-inviscid interaction INASA-TP-31971 p 827 N92-28477 Application of piloted simulation to high-angle-of-attack flight-dynamics research for fighter aircraft p 886 N92-28551 Natural flow wing [NASA-CASE-LAR-14281-1] p 829 N92-28729 Spatial and temporal adaptive procedures for the unsteady aerodynamic analysis of airfoils using unstructured meshes [NASA-TM-107635] p 831 N92-29445 Aerodynamic design optimization using sensitivity analysis and computational fluid dynamics p 910 N92-29830 [NASA-CASE-LAR-14815-1-CU] Active thermal isolation for temperature responsive sensors [NASA-CASE-LAR-14612-1] p 911 N92-29954 Helicopter low-speed yaw control [NASA-CASE-LAR-14219-1] p 879 N92-30025 Combined load test apparatus for flat panels INASA-CASE-LAR-14698-11 p 911 N92-30028 Apparatus for elevated temperature compression or tension testing of specimens [NASA-CASE-LAR-14775-1] p 912 N92-30099 The 1991 International Conference on Aging Aircraft and Structural Airworthiness [NASA-CP-3160] p 912 N92-30106 Fracture mechanics research at NASA related to the p 913 N92-30110 aging commercial transport fleet Damaged stiffened shell research at NASA. Langley Research Center p 914 N92-30115 Thermal QNDE detection of airframe disbonds p 914 N92-30118 National Aeronautics and Space Administration, Lewis Research Center, Cleveland, OH. Hot gas ingestion characteristics and flow visualization of a vectored thrust STOVL concept p 860 A92-45316 Integrated flight/propulsion control for supersonic p 872 A92-45320 Experimental and analytical study of close-coupled

ventral nozzles for ASTOVL aircraft p 861 A92-45325

Experimental investigation of the flowfield of an [AIAA PAPER 92-2622] p 793 A92-45494 LOV measurements on a rectangular wing with a simulated glaze ice accretion p 800 A92-45537 [AIAA PAPER 92-2690] Navier-Stokes analysis and experimental data comparison of compressible flow in a diffusing S-duct p 800 A92-45541 [AIAA PAPER 92-2699] Design and analysis of vortex generators on reengined Boeing 727-100QF center inlet S-duct by a reduced Navier-Stokes code IAIAA PAPER 92-27001 p 800 A92-45542 The flip flop nozzle extended to supersonic flows [AIAA PAPER 92-2724] p 803 A92-45561 Surface and flow field measurements in a symmetric crossing shock wave/turbulent boundary layer flow AIAA PAPER 92-2634] p 806 A92-45574 Fiber optic controls for aircraft engines - Issues and [AIAA PAPER 92-2634] p 856 A92-46244 implications Potential for integrated optical circuits in advanced aircraft with fiber optic control and monitoring systems p 856 A92-46246 Predicted pressure distribution on a prop-fan blade through Euler analysis p 810 A92-46791
Noise of two high-speed model counter-rotation propellers at takeoff/approach conditions p 925 A92-46799 Development of an efficient analysis for high Reynolds number inviscid/viscid interactions in cascades [AIAA PAPER 92-3073] p 823 A92-48723 Airfoil wake and linear theory gust response including sub and superresonant flow conditions
[AIAA PAPER 92-3074] p p 823 A92-48724 A fast, uncoupled, compressible, two-dimensional, unsteady boundary layer algorithm with separation for engine inlets [AIAA PAPER 92-3082] Interface of an uncoupled boundary layer algorithm with an inviscid core flow algorithm for unsteady supersonic [AIAA PAPER 92-3083] p 823 A92-48730 Mixing in the dome region of a staged gas turbine [AIAA PAPER 92-3089] p 903 A92-48734 Experimental study of cross-stream mixing in a [AIAA PAPER 92-3090] p 903 A92-48735 Comparative study of turbulence models in predicting hypersonic inlet flows [AIAA PAPER 92-3098] n 824 A92-48740 Computational analysis of ramjet engine inlet [AIAA PAPER 92-3102] p 824 A92-48744 An experimental investigation of high-aspect-ratio cooling passages [AIAA PAPER 92-3154] p 890 A92-48780 Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. I - Design development and performance of the research facility [AIAA PAPER 92-3325] p 883 A92-48908 Investigation of three-dimensional flow field in a turbine including rotor/stator interaction. II - Three-dimensional p 883 A92-48908 flow field at the exit of the nozzle [AIAA PAPER 92-3326] p 826 A92-48909 A simplified reaction mechanism for prediction of NO(x) emissions in the combustion of hydrocarbons p 894 A92-48919 [AIAA PAPER 92-3340] Advanced Rotorcraft Transmission program summary [AIAA PAPER 92-3363] p 905 A92-48936 Boeing Helicopters Advanced Rotorcraft Transmission (ART) Program summary of component tests p 905 A92-48937 [AIAA PAPER 92-3364] Advanced Rotorcraft Transmission (ART) Program summary AIAA PAPER 92-3365] p 905 A92-48938 Advanced Rotorcraft Transmission (ART) - Component [AIAA PAPER 92-3365] [AIAA PAPER 92-3366] p 905 A92-48939 Supersonic jet mixing enhancement by 'delta-tabs' [AIAA PAPER 92-3548] p 826 A92-49063 A computational study of advanced exhaust system transition ducts with experimental validation p 907 A92-49126 [AIAA PAPER 92-3794] Analytical and experimental studies of heat pipe radiation cooling of hypersonic propulsion systems p 867 A92-49128 [AIAA PAPER 92-3809] Internal reversing flow in a tailpipe offtake configuration for SSTOVL aircraft NASA-TM-105698 p 868 N92-28418 Full Navier-Stokes analysis of a two-dimensional mixer/ejector nozzle for noise suppression INASA-TM-105715 p 868 N92-28419 Application of face-gear drives in helicopter transmissions

8- by 6-foot supersonic/9- by 15-foot low speed wind tunnel INASA-TM-1054171 resulting drag increase for a NACA 0012 airfoil INASA-TM-1057431 a new method of imaging data analysis [NASA-TM-105745] an annular cascade of high turning core turbine vanes response operating from a resonant AC link [NASA-TM-105716] compressor velocity measurements INASA-TM-1057171 Dynamics of a split torque helicopter transmission [NASA-TM-105681] NASA Lewis Research Center INASA-TM-1057311 water injection into turbine cooling air [NASA-TM-105680] oscillating airfoil INASA-TM-1056751 National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL. Laminar hypersonic flow over a compression using the [AIAA PAPER 92-2896] Solution of the Burnett equations for hypersonic flows near the continuum limit IAIAA PAPER 92-29221 National Aeronautics and Space Administration. Pasadena Office, CA. Microwave temperature profiler for clear air turbulence prediction [NASA-CASE-NPO-18115-1-CU] National Aerospace Lab., Amsterdam (Netherlands).

Aircraft simulation and pilot proficiency: From surrogate flying towards effective training Hyperbolic grid generation with BEM source terms
[NLR-TP-90334-U] p 923 N92-28 A simple and low cost system to measure delay times in pneumatic systems [NLR-TP-90174-U] The use of load enhancement factors in the certification of composite aircraft structures [NLR-TP-90068-U] Some longitudinal handling qualities design guidelines for active control technology transport aircraft [NLR-TP-90129-U] Response of helicopters to gusts INLR-TP-90159-U1 Potential applications of laser Doppler anemometry for in-flight measurements INLR-TP-90163-U1 Application of knowledge-based systems for diagnosis of aircraft systems INLR-TP-90192-U1 Analysis of results of an Euler-equation method applied to leading-edge vortex flow INLR-TP-90368-U1 Comparison of LDA and LTA applications for propeller tests in wind tunnels INLR-MP-88031-UI Calculation of unsteady subsonic and supersonic flow about oscillating wings and bodies by new panel methods Constrained spanload optimization for minimum drag of multi-lifting-surface configurations INLR-TP-89126-U1 The windtunnel as a tool for laminar flow research [NLR-TP-90145-U] Instrumentation requirements for laminar flow research in the NLR high speed wind tunnel HST [NLR-TP-89158-U] LAH-main rotor model test at the DNW [NLR-TP-90305-U] Atmospheric turbulence spectra and correlation [NLR-TP-89217-U] Development and validation of a characteristic boundary condition for a cell-centered Euler method INLR-TP-90144-U|

Flow quality studies of the NASA Lewis Research Center Experimental validation of a line-duct acoustics model [NLR-TP-90223-U] p 927 N92-28695 Wave drag determination in the transonic full-potential Experimental and computational ice shapes and p 828 N92-28709 INLR-TP-90062-UI p 828 N92-28674 Diffuser casing upgrade for an advanced turbofan Results of a low power ice protection system test and INLR-TP-90097-U1 p 870 N92-28711 Boundary conditions for Euler equations at internal block p 828 N92-28696 faces of multi-block domains using local grid refinement Laser anemometer measurements and computations in [NLR-TP-90134-U] p 908 N92-28712 Flow gradient corrections on hot-wire measurements p 830 N92-28980 using an X-wire probe [NLR-TP-90255-U] Electromechanical systems with transient high power p 829 N92-28713 S-76B certification for vertical take-off and landing p 870 N92-28985 perations from confined areas A 4-spot time-of-flight anemometer for small centrifugal p 852 N92-28714 [NLR-TP-90286-U] NARSIM: A real-time simulator for air traffic control p 909 N92-29105 (NLR-TP-90147-U) p 888 N92-29204 p 910 N92-29136 Applied analytical combustion/emissions research at the Short cracks and durability analysis of the Fokker 100 wing/fuselage structure p 910 N92-29603 p 890 N92-29343 INLR-TP-90336-U1 Contingency power for a small turboshaft engine by using Hyperbolic grid generation control by panel methods [NLR-TP-91061-U] p 924 N92-29604 p 871 N92-29661 European studies to investigate the feasibility of using Experimental investigation of the flowfield of an 1000 ft vertical separation minima above FL 290. Part 1: Overview of organisation, techniques employed, and p 833 N92-30182 INI R-TP-91062-U-PT-11 p 841 N92-29605 Application of VME-technology on an airborne data link INI R-MP-88040-111 NLR-MP-88040-U] p 841 N92-29615 Results of a flight simulator experiment to establish p 820 A92-47872 handling quality guidelines for the design of future transport aircraft p 821 A92-47894 [NLR-MP-88044-U] p 854 N92-29616 On the optimization of windshear warning and guidance Evaluation of measured-boundary-condition methods for p 916 N92-29148 3D subsonic wall interference [NLR-TR-88072-U] A method for computing the 3-dimensional flow about p 884 N92-28532 wings with leading-edge vortex separation. Part 2: Description of computer program VORSEP p 923 N92-28635 [NLR-TR-86006-U] p 833 N92-29916
National Aerospace Lab., Emmeloord (Netherlands).
Ageing aircraft research in the Netherlands p 833 N92-29916 p 859 N92-28644 p 838 N92-30129 National Aerospace Lab., Tokyo (Japan). Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow performance NAL-TM-6321 p 887 N92-28829 Upgrading the data processing section of the NAL Gust Wind Tunnel data processing system p 879 N92-28653 [NAL-TM-635] p 888 N92-28833 Replacement of the NAL high pressure air storage p 859 N92-28654 INAL-TM-6341 p 888 N92-28835 Quaternion and Euler angles in kinematics p 837 N92-28655 Aerodynamic characteristics obtained from alpha sweep test of the quiet STOL experimental aircraft ASKA [NAL-TR-1112] p 827 N92-28657 Naval Aerospace Medical Research Lab., Pensacola, Use of a commercially available flight simulator during aircrew performance testing [AD-A245922] p 883 N92-28407 Naval Air Development Center, Warminster, PA. Tensile and interlaminar properties of GLARE (trade p 827 N92-28659 name) laminates [AD-A250188] p 895 N92-28921 Naval Air Test Center, Patuxent River, MD. Use of high-fidelity simulation in the development of an n 828 N92-28660 F/A-18 active ground collision avoidance system p 837 N92-28530 p 887 N92-28661 Naval Civil Engineering Lab., Port Hueneme, CA. Paint removal using cryogenic processes [AD-A247668] p 895 N92-28912 p 887 N92-28669 Naval Postgraduate School, Monterey, CA. NPSNET: Flight simulation dynamic modeling using p 852 N92-28687 quaternions [AD-A247484] p 923 N92-28245 Stability and control flight testing of a half-scale Pioneer p 915 N92-28689 remotely piloted vehicle p 879 N92-28801 [AD-A245973] Tasking and communication flows in the F/A-18D p 828 N92-28692 cockpit: Issues, problems, and possible solutions AD-A245977] p 853 N92-28802
Flow visualization studies of a sideslipping, Turbulence modeling: Survey of activities in Belgium and [AD-A245977] the Netherlands, and appraisal of the status and a view canard-configured X-31A-Like fighter aircraft model on the prospects NLR-TP-90184-U] p 908 N92-28694 [AD-A245940] p 829 N92-28883

[NASA-TM-105655]

p 908 N92-28434

Improving the LAMP Mk 3 SH-60B HF communication system

AD-A2459701 p 910 N92-29344 Naval Surface Warfare Center, Dahlgren, VA.

Second-order shock-expansion theory extended to include real gas effects

IAD-A2471911 p 831 N92-29539

Naval Training Systems Center, Orlando, FL. An analysis of aircrew communication patterns and content

[AD-A246618] p 907 N92-28253

North Carolina State Univ., Raleigh.

Buffet test in the National Transonic Facility

[NASA-CR-189595] p 888 N92-29352 Northwest Airlines, Inc., Minneapolis, MN.

Current and future developments in civil aircraft non-destructive evaluation from an operator's point of view p 787 N92-30122

0

Oak Ridge National Lab., TN.

Assessment of valve actuator motor rotor degradation by Fourier Analysis of current waveform p 909 N92-28814 DE92-013233 |

Office National d'Etudes et de Recherches

Aerospatiales, Paris (France).

Use of a research simulator for the development of new concepts of flight control n 885 N92-28543 Construction of a numerical optimization method for the

definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788 Feasibility study of hypersonic

measurements at R3Ch p 829 N92-28789 IONERA-RSF-136/1865-AY-728-1 three-dimensiona

Development of an unsteady viscous-inviscid interaction numerical method for the calculation of airfoils vibration [ONERA-RSF-7/3617-AY-022A] p 830 N92-29206

Survey of French activities concerning structural p 838 N92-30130 airworthiness and aging aircraft Ohio Univ., Athens.

Loran-C performance assurance assessment program [NASA-CR-190469] p 840 N92-28718

Nonlinear normal and axial force indicial responses for a two dimensional airfoil [AD-A247196] p 830 N92-28888

Old Dominion Univ., Norfolk, VA.

Viscous effects on a vortex wake in ground effect [NASA-CR-190400] p 907 N92-28361

Nonlinear analyses of composite aerospace structures in sonic fatigue [NASA-CR-190565] p 854 N92-30209

Oxford Univ. (England). Turbulent spot generation and growth rates in a transonic boundary layer

p 909 N92-29118 [AD-A250221]

Pennsylvania State Univ., University Park.

Explicit Navier-Stokes computation of turbomachinery

[AD-A249284] p 909 N92-28879 Explicit Navier-Stokes computation of turbomachinery

p 911 N92-29933 [AD-A248458]

Pratt and Whitney Aircraft, West Palm Beach, FL.

Fatigue in single crystal nickel superalloys [AD-A248190] p 896 N92-29408

Reinhart and Associates, Inc., Austin, TX.

Surface residual stress analysis of metals and alloys [AD-A248372] p 895 N92-28426

Royal Aerospace Establishment, Bedford (England). Validation of simulation systems for aircraft acceptance p 852 N92-28531

Royal Aerospace Establishment, Farnborough (England).

Practical considerations in designing the engine cycle p 869 N92-28460

Royal Netherlands Air Force, The Hague.

Diffuser casing upgrade for an advanced turbofan [NLR-TP-90097-U] p 870 N92-28 p 870 N92-28711

S

Saab-Scania, Linkoping (Sweden).

A manufacturer's approach to ensure long term p 838 N92-30133 structural integrity

Sacramento Air Logistics Center, McClellan AFB, CA. Nondestructive inspection perspectives p 915 N92-30121

Sandia National Labs., Albuquerque, NM.

Aging aircraft NDI Development and Demonstration Center (AANC): An overview p 915 N92-30120

Science Applications International Corp., San Antonio, Turbine aircraft engine operational trending and JT8D

static component reliability study p 870 N92-28686

Sikorsky Aircraft, Stratford, CT.

Full mission simulation: A view into the future p 884 N92-28537

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Moissy-Cramayel (France).

Steady and transient performance calculation method for prediction, analysis, and identification

p 869 N92-28461 Southwest Research Inst., San Antonio, TX.

High-temperature miniaturized turbine engine lubrication system simulator IAD-A2492591 p.868 N92-28294

Stanford Univ., CA.

A preliminary experimental investigation of local isotropy in high-Reynolds-number turbulence

p 912 N92-30042

Non-linear interactions in homogeneous turbulence with and without background rotation p 912 N92-30044 Methods for direct simulation of transition in hypersonic boundary layers 2 p 912 N92-30064 Effect of walls on the supersonic reacting mixing layer p 912 N92-30065

State Univ. of New York, Buffalo.

Modeling of the reactant conversion rate in a turbulent p 829 N92-28820

Sverdrup Technology, Inc., Brook Park, OH.

A comparison of the calculated and experimental off-design performance of a radial flow turbine

[NASA-CR-189207] N92-29402 p 831

Systems Technology, Inc., Hawthorne, CA.

The use of ground based simulation for handling qualities research: A new assessment p 885 N92-28545 Effects of cockpit lateral stick characteristics on handling qualities and pilot dynamics [NASA-CR-4443] p 878 N92-28584

Technische Univ., Delft (Netherlands).

The basic research simulator programme and the industrial and aerospace community: Opportunities for cooperative research

p 887 N92-28579 LR-6621 Inverse control problems: Mathematical preliminaries, system theoretical approaches, and their applications to aircraft dynamics

p 923 N92-28581

Technische Univ., Munich (Germany, F.R.).

Calculation of installation effects within performance computer programs p 869 N92-28465

Tennessee Univ., Tullahoma.

Development of a multigrid transonic potential flow code for cascades [NASA-CR-190480] p 830 N92-29361

Texas A&M Univ., College Station.

Determination of aerodynamic sensitivity coefficients for wings in transonic flow [NASA-CR-190570] p 832 N92-29657

Thomson Composants, Saint Egreve (France). p 859 N92-28377 What is an ASIC?

Thomson-CSF, Montrouge (France).

A radar signal processing ASIC and a VME interface circuit p 859 N92-28380

Toledo Univ., OH. Users manual for updated computer code for axial-flow

compressor conceptual design [NASA-CR-189171] p 924 N92-30207

Toronto Univ., Downsview (Ontario).

An evaluation of IFR approach techniques; Generic helicopter simulation compared with actual flight p 886 N92-28550

Turbine Support Europa, Tilburg (Netherlands).

Diffuser casing upgrade for an advanced turbofan (NLR-TP-90097-U) p 870 N92-28711

United Kingdom Atomic Energy Authority, Harwell (England).

Report on the workshop on Ion Implantation and Ion Beam Assisted Deposition [AD-A250561] p 927 N92-28923

Universitäet der Bundeswehr Muenchen, Neuhlbern

(Germany, F.R.).

A semi empirical method for the analytical representation of stationary measured profile coefficients for applications of rotary wing aerodynamics

p 832 N92-29741 [ETN-92-91491] Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence on profile measurements

[ETN-92-91492] p 833 N92-29889 Examination of the main error factors with regards to

secondary losses in compression and turbine cascades by variations of the blade picture ratio IETN-92-914931 p 871 N92-29927

Virginia Polytechnic Inst. and State Univ., Blacksburg. Dynamic simulation of compressor and gas turbine performance p 869 N92-28463

Washington State Univ., Pullman.

Study of the leading-edge vortex dynamics in the unsteady flow over an airfoil

[AD-A247532] p 829 N92-28865

Washington Univ., Seattle Tear straps in airplane fuselage

AD-A2485431 p 854 N92-29511

Wright Lab., Wright-Patterson AFB, OH.

Piloted simulation effectiveness development applications and limitations p 883 N92-28524 A methodology for the evaluation of runway roughness

p 887 N92-28772

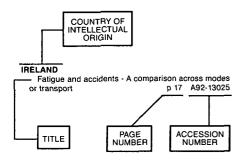
p 927 N92-28556

for repair [AD-A250407]

[NASA-CR-189643]

Wyle Labs., Inc., El Segundo, CA. Evaluation of outdoor-to-indoor response to minimized onic booms

Typical Foreign Technology Index Listina



Listings in this index are arranged alphabetically by country of intellectual origin. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the citation in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

AUSTRALIA

A training program for airline line instructors

p 835 A92-45044 Separated high enthalpy dissociated laminar hypersonic flow behind a step - Pressure measurements

p 809 A92-45858

Waves and thermodynamics in high Mach number propulsive ducts p 809 A92-46431

Measurement of shock-wave/boundary-layer interaction p 813 A92-46903 in a free-piston shock tunnel

Flow visualisation of a small diam eter rotor operating at high rotational speeds with blades at small pitch p 814 A92-46949 angles

Reduction and analysis of F-111C flight data p 853 N92-28771 [AD-A250341]

Aging commuter aeroplanes: Fatigue evaluation and p 915 N92-30132 control methods

В

BRAZIL

Approach for analysis and design of composite roto p 899 A92-46801 configuration in Whirt-flutter stability of a pusher p 845 A92-46813 nonuniform flow

Investigation of the structural inhomogeneity of a p 893 A92-47958 titanium alloy

CANADA

Spectrogram diagnosis of aircraft disasters [SAE PAPER 912041] p 836 p 836 A92-45425 Effect of throat contouring two-dimensional converging-diverging nozzles using URS method p 797 A92-45520 [AIAA PAPER 92-2659]

Unsteady pressure and load measurements on an F/A-18 vertical fin at high-angle-of-attack [AIAA PAPER 92-2675] p 798 A92-45529 Prediction of laminar boundary layer using cubic p 801 A92-45544 [AIAA PAPER 92-2702] Prediction of leading-edge vortex breakdown on a delta wing oscillating in roll [AIAA PAPER 92-2677] p 807 A92-45585 Aerodynamic characteristics of hoar frost roughness A92-45829 p 808 Statistical prediction of maximum buffet loads on the F/A-18 vertical fin p 811 A92-46816 Interactive generation of structured/unstructured surface meshes using adaptivity p 919 A92-47066 Wing leading edge design with composites to meet bird p 848 A92-47404 strike requirements Establishing two-dimensional flow in a large-scale planar turbine cascade [AIAA PAPER 92-3066] p 823 A92-48720 Overview on basis and use of performance prediction methods p 869 N92-28459 Component performance requirements p 869 N92-28462 Engine performance and health monitoring models using steady state and transient prediction methods p 870 N92-28467 The use of a dedicated testbed to evaluate simulator

p 884 N92-28533 training effectiveness

The evaluation of simulator effective ness for the training of high speed, low level, tactical flight operations

p 885 N92-28539 An evaluation of IFR approach techniques: Generic helicopter simulation compared with actual flight

p 886 N92-28550 Transport Canada aging aircraft activities p 838 N92-30131

CHINA

The fatigue scatter factors and reduction factors in the design of aircraft and helicopter's structural lives (SAE PAPER 911984) p 843

New method of swirl control in a diffusing S-duct

A92-45859 p 809 Research of environmental spectrum for aircraft p 785 A92-47655

A method of failure analysis of complicated structures p 901 A92-47656

Probability analysis of structure failure for the wings with ain and subordinate components p 848 A92-47657 main and subordinate components Optimal maintenance program of damage tolerance p 785 A92-47660 structure

A study on crack initiation method for durability p 901 A92-47663 Durability analysis for a main bulkhead subjected to load

p 848 A92-47664 on the body of an aircraft Sonic fatigue analysis and anti-sonic fatigue design of

p 848 A92-47666 aircraft structure A failure analysis for landing gear structural system

p 849 A92-47667 Economic life analysis for replacing components p 785 A92-47670

Approximate analysis for failure probability of structural

p 901 A92-47671 The calculation of three-dimensional compressible boundary layer stability on swept wings

p 818 A92-47684 The numerical simulation of comp ressible flow around p 818 an airfoil at high angle of attack A92-47686 A time marching method in finite volume for transonic diffuser turbulent flows p 819 A92-47690

A new method for predicting the end wall boundary layers and the blade force defects inside the passage of axial p 819 compressor cascades A92-47691

Basic analysis of counter-rotating turbines p 862 A92-47692

An improved multiple line-vortex method for simulation of separated vortices of slender wings

p 819 A92-47694 Aerodynamic sensitivities for subsonic lifting-surface p 819 A92-47695

Study on two variable control plan for twin spool turbojet p 862 A92 47697

An experimental investigation on aft bypass supersonic inlet performance at high angle of attack and yaw

p 862 A92-48268 methods on equivalence multi-propellant for propulsion system

p 893 A92-48269 Location and tracking technique in a multistatic system established by multiple bistatic systems

p 840 A92-48480 control thermo-protection
[AIAA PAPER 92-3054] p 889 A92-48712 A simplified real-time engine model for developing aeroengine control system [AIAA PAPER 92-3321] p 864 A92-48904 Improved method for estimation of the maximum instantaneous distortion values [AIAA PAPER 92-3623] p 826 A92-49076 A new vane swirler as applied to dual-inlet side-dump

combustor [AIAA PAPER 92-3654] p 906 A92-49085

FRANCE

The DAM vertical shock-tube p 880 A92-45096 An improved approach for the computation of transonic/supersonic flows with applications to aerospace configurations

[AIAA PAPER 92-2613] A new automatic grid generation environment for CFD applications

[AIAA PAPER 92-2720] p 803 A92-45558 Wideband control of gyro/accelerometer multisensors p 856 A92-46736 in a strapdown guidance system Experimental and numerical study of flow around

helicopter rotor blade tips p 814 A92-46948 Experimental and computational studies of hovering p 815 A92-46954 rotor flows

Anisotropic control of mesh generation based upon a p 918 A92-47043 Voronoi type method Real time presentation for RAFALE in-flight tests

p 882 A92-47522 Industrial practice in aeronautical maintenance

p 786 A92-47774 Numerical and experimental investigation of rarefied

compression corner flow [AIAA PAPER 92-2900] p 820 A92-47876 A340 handling, cockpit design improve on predecessor

A320 p 849 A92-47969 Calculation of fully three-dim onal separated flows

with an unsteady viscous-inviscid interaction method [ONERA, TP NO. 1992-1] p 821 A92-48 p 821 A92-48577 Advanced superalloys for turbine blade and vane

applications [ONERA, TP NO. 1992-2] p 893 A92-48578

Separation and vortex formation in turbulent flows p 822 A92-48579 [ONERA, TP NO. 1992-7]

The design and testing of an airfoil with hybrid laminar

[ONERA, TP NO. 1992-22] p 822 A92-48585 The A320 laminar fin programme

[ONERA, TP NO. 1992-23] p 849 A92-48586 Trends in commercial aircraft design - What evolution

factors and what approach? [ONERA, TP NO. 1992-25] p 786 A92-48587 Research on helicopter Progress in rotors aerodynamics, aeroelasticity and acoustics

p 849 [ONERA, TP NO. 1992-27] A92-48589 Numerical analysis of an engine turbine disk loaded with

a large number of thermomechanical cycles [ONERA, TP NO. 1992-31] p 902 A92-48592 Basic experiments on the directivity of the sound

radiation emitted by a turboshaft engine p 926 A92-48597 [ONERA, TP NO. 1992-36]

New hypersonic test methods developed at ONERA -The R5 and F4 wind tunnels

[ONERA, TP NO. 1992-39] p 882 A92-48600 Influence of geometrical parameters on helicopter rotor

high speed impulsive noise [ONERA, TP NO. 1992-40] p 926 A92-48601 Acoustic spinning-mode analysis by iterative threshold

method applied to a helicopter turboshaft engine [ONERA, TP NO. 1992-41] p 926 A92-48602	Positioning System (CCNS/GPS) - A guidance, positioning, and management system for remote sensing flights	numbers [DLR-FB-91-28]
Indirect measurements of convective flow by IR	p 840 A92-47630	Experience with pilote
thermography [ONERA, TP NO. 1992-46] p 902 A92-48607	Construction of a real-time DGPS experimental system p 840 A92-47631	of helicopters [MBB-UD-0610-91-PUB
Advances in aircraft modal identification	Calculation of hypersonic, viscous, non-equilibrium flows	Acquisition of an aer
[ONERA, TP NO. 1992-47] p 877 A92-48608	around reentry bodies using a coupled boundary layer/Euler method	means of a winged expe [MBB/FE202/S/PUB/4
Aluminides modified by palladium - Protection of new parts by local finishing	[AIAA PAPER 92-2856] p 819 A92-47839	GREECE
(ONERA, TP NO. 1992-49) p 893 A92-48610	Computation of 3-D hypersonic flows in chemical non-equilibrium including transport phenomena	Transonic unsteady
Research and studies on quiet helicopters [ONERA, TP NO. 1992-59] p 926 A92-48618	[AIAA PAPER 92-2876] p 820 A92-47858	simulation around 2-D m [AIAA PAPER 92-2704]
[ONERA, TP NO. 1992-59] p 926 A92-48618 Advanced CFD simulation and testing of compressor	Numerical simulation of chemical and thermal nonequilibrium flows behind compression shocks	[//////////////////////////////////////
blading in the multistage environment	[AIAA PAPER 92-2879] p 820 A92-47860	
[AIAA PAPER 92-3040] p 822 A92-48701 Applications of ASICs to avionics	Bistatic scattering on a monostatic radar range	
[AGARD-AG-329] p 859 N92-28376	p 849 A92-48408 Motion errors in an airborne synthetic aperture radar	INDIA
What is an ASIC? p 859 N92-28377	system p 840 A92-48416	Contribution of individ under aircraft spectrum I
A radar signal processing ASIC and a VME interface circuit p 859 N92-28380	Comparison between two 3D-NS-codes and experiment on a turbine stator	Microbiological spoil
Steady and Transient Performance Prediction of Gas	[AIAA PAPER 92-3042] p 822 A92-48703	Evaluation of a suitable I
Turbine Engines	Investigations of propulsion integration interference effects on a transport aircraft configuration	Optimization of constar of turbojet aircraft
[AGARD-LS-183] p 868 N92-28458 Steady and transient performance calculation method	[AIAA PAPER 92-3097] p 849 A92-48739	IRELAND
for prediction, analysis, and identification	Numerical study of secondary separation in glancing	Organizational facto
p 869 N92-28461	shock/turbulent boundary layer interactions [AIAA PAPER 92-3666] p 907 A92-49087	investigation
Aircraft ship operations [AGARD-AR-312] p 850 N92-28468	Numerical flow simulation and analysis of a shrouded	Fuel regression mecha
Integrated Design Analysis and Optimisation of Aircraft	propfan rotor [AIAA PAPER 92-3773] p 826 A92-49118	C4
Structures	Calculation of installation effects within performance	Structural risk assessi fleet management
[AGARD-LS-186] p 851 N92-28469 Structural optimization of aircraft p 851 N92-28472	computer programs p 869 N92-28465 Practical architecture of design optimisation software for	Maximizing thrust-vec
Piloted Simulation Effectiveness	aircraft structures taking the MBB-Lagrange code as an	metrics
[AGARD-CP-513] p 786 N92-28522	example p 851 N92-28471	Modern techniques for
Flight simulation and digital flight controls p 884 N92-28526	Mathematical optimization: A powerful tool for aircraft design p 851 N92-28474	The effect of tip conv
Use of a research simulator for the development of new	Opportunities for flight simulation to improve operational	optimum dimensions of c The External Propulsion
concepts of flight control p 885 N92-28543	effectiveness p 883 N92-28523 Experience with piloted simulation in the development	without interaction with a
The role of simulation for the study of APIS (piloting support by synthetic imagery) p 885 N92-28544	of helicopters p 884 N92-28528	[AIAA PAPER 92-3717]
Construction of a numerical optimization method for the	Use of a virtual cockpit for the development of a future transport aircraft p 886 N92-28547	An unfactored implicit :
definition of hypersupported profiles [ONERA-RSF-43/1736-AY-146A] p 908 N92-28788	The role of systems simulation for the development and	flows
Feasibility study of hypersonic clinometric	qualification of ATTAS p 886 N92-28548	[AIAA PAPER 92-2668]
measurements at R3Ch [ONERA-RSF-136/1865-AY-728-] p 829 N92-28789	Calculation of support interferences on the aerodynamic coefficients for a wind tunnel calibration model	Experimental investiga wings
Development of an unsteady three-dimensional	[ESA-TT-1247] p 830 N92-29159	[AIAA PAPER 92-2731]
viscous-inviscid interaction numerical method for the calculation of airfoils vibration	DLR research reports and communications [ETN-92-91391] p 929 N92-29218	Viscous high-speed flov embedding techniques
[ONERA-RSF-7/3617-AY-022A] p 830 N92-29206	Saenger: The reference concept and its technological	Hang-glider response t
Ageing airplane repair assessment program for Airbus A300 p 838 N92-30123	requirements - aerothermodynamics [MBB-FE-202-S-PUB-0463-A] p 890 N92-29629	Linear analysis of
Survey of French activities concerning structural	Technology programme: Aerothermodynamics and	anisotropic beam
airworthiness and aging aircraft p 838 N92-30130	propulsion integration. Numerical and experimental	A new integral equation
c	aerothermodynamics [MBB-FE-202-S-PUB-0464-A] p 831 N92-29648	aerodynamics of rotors in
G	Aerothermodynamics and propulsion integration in the	An unstructured me
GERMANY	Saenger technology programme [MBB-FE-202-S-PUB-0469-A] p 831 N92-29649	three-dimensional aerona
Centre for Flight Simulation Berlin Airbus 340 simulator for research and training p 880 A92-45028	Concurrent engineering in design of aircraft structures	Numerical computati
Concepts for the stability analysis of NLF-experiments	[MBB-FE-2-S-PUB-472] p 854 N92-29650	cascades [AIAA PAPER 92-3041]
on swept wings [AIAA PAPER 92-2706] p 801 A92-45548	Aerothermodynamic challenges of the Saenger space-transportation system	Expert systems for
[AIAA PAPER 92-2706] p 801 A92-45548 Turbulent drag reduction by laminar sublayer	[MBB-FE-202-S-PUB-0462-A] p 890 N92-29680	diagnostics of engines [AIAA PAPER 92-3327]
thickening	Hypersonic flow past radiation-cooled surfaces	Prediction of gas turb
[AIAA PAPER 92-2707] p 801 A92-45549 Application of the Euler method EUFLEX to a fighter-type	[MBB-FE-202-S-PUB-0468-A] p 832 N92-29713 A semi empirical method for the analytical representation	element code [AIAA PAPER 92-3469]
airplane configuration at transonic speed	of stationary measured profile coefficients for applications	The numerical simulati
[AIAA PAPER 92-2620] p 845 A92-45573 A new milestone in automatic aircraft control - Fly-by-light	of rotary wing aerodynamics [ETN-92-91491] p 832 N92-29741	of gas turbine engines [AIAA PAPER 92-3760]
systems transmit commands optoelectronically	Sensor fault detection on board an aircraft with observer	AM-X flight simulator 1
p 784 A92-45699 Thrust/speed effects on long-term dynamics of	and polynomial classifier	device
aerospace planes p 889 A92-46766	[DLR-FB-91-34] p 859 N92-29870 Computed Tomography (CT) as a nondestructive test	
Reconstruction of flight path in turbulence p 874 A92-46777	method used for composite helicopter components	
Calibration-related pseudo-Reynolds number trends in	[MBB-UD-0603-91-PUB] p 910 N92-29873	JAPAN
transonic wind tunnels p 882 A92-46780	Repair procedures for advanced composites for helicopters	Study of grinding proce
Simulation of transonic flow over twin-jet transport aircraft p 811 A92-46793	(MBB-UD-0606-91-PUB) p 787 N92-29874	insulated engine [SME PAPER MR91-177]
A Mach-scaled powered model for rotor-fuselage	Global and high resolution radar cross section measurements and two-dimensional microwave images of	Estimation of spaceplar
interactional aerodynamics and flight mechanics investigations p 847 A92-46960	a scaled aircraft model from the type Airbus A 310	control derivatives from d [SAE PAPER 911979]
Multi-block grid generation around	[DLR-MITT-91-10] p 911 N92-29877	Spaceplane longitudi
wing-body-engine-pylon configurations p 817 A92-47060	Production of periodical Mach number variations in high subsonic flow in a blow down wind tunnel, and its influence	estimation by cable-mour [SAE PAPER 911980]
Interactive algebraic mesh generation for twin jet	on profile measurements [ETN-92-91492] p 833 N92-29889	Experimental studies of
transport aircraft n 817 A92-47064	1E 111-32-3 [432] 9 033 [N97-2889]	SSTO vehicle at low sub-

Computer-Controlled Navigation System/General

FOREIGN TECHNOLOGY INDEX Jet aircraft noise at high subsonic flight Mach p 928 N92-29997 ed simulation in the development p 889 N92-30076 rothermodynamic data base by erimental reentry vehicle 611 p 787 N92-30232 inviscid and viscous flow's noving bodies p 801 A92-45546 ſ lual load cycles to crack growth loading p 891 A92-45236 lage of aviation turbine fuel. II hiocide p 891 A92-45600 nt altitude-constant airspeed flight p 845 A92-46815 ors in human factors accident p 834 A92-45000 anism in a solid fuel ramjet p 860 A92-44898 ment in the Israel Air Force for p 836 A92-46779 ctoring control power and agility p 874 A92-46794 monitoring airborne telemetry p 857 A92-47560 vection on the performance and cooling fins p 902 A92-48354 on Accelerator - Scramjet thrust accelerator barrel p 866 A92-49098 scheme for 3D inviscid transonic p 798 A92-45523 ition of vortex dynamics on delta p 804 A92-45565 w computations by adaptive mesh p 808 A92-45839 to atmospheric inputs p 874 A92-46765 naturally curved and twisted p 899 A92-46936 on for potential compressible n forward flight p 815 A92-46958 esh generation algorithm for autical configurations p 918 A92-47053 ions of transonic flows through p 822 A92-48702 the trouble-shooting and the p 923 A92-48910 ine combustor flow by a finite p 906 A92-49016 ion of the main fuel control unit p 867 A92-49115 from engineering tool to training p 884 N92-28536

ess and strength for ceramic heat p 897 A92-45260 ne lateral-directional stability and

dynamic wind tunnel test p 872 A92-45384 final aerodynamic parameter nt dynamic wind-tunnel test

p 788 A92-45385 on aerodynamic characteristics of SSTO vehicle at low subsonic speeds [SAE PAPER 911981] p 788 A92-45386

Numerical simulations of separated flows around oscillating airfoil for dynamic stall phenomena [SAE PAPER 911991] p 788 p 788 A92-45393

family

transport aircraft

p 817 A92-47064

p 848 A92-47591

p 785 A92-47592

Airbus A319 - Completion of the standard fuselage

German-GUS cooperation in civil aviation

[ÉTN-92-91493]

Examination of the main error factors with regards to

p 871 N92-29927

secondary losses in compression and turbine cascades

by variations of the blade picture ratio

Wind tunnel investigation of an improved upper surface
blown flap transport semi-span model
[SAE PAPER 911993] p 789 A92-45395
An acrobatic airship 'Acrostat' [SAE PAPER 911994] p 843 A92-45396
Ducted fan VTOL for working platform
[SAE PAPER 911995] p 843 A92-45397 Response characteristics of a wing in supersonic flow
near flutter boundary
[SAE PAPER 911999] p 789 A92-45401
Preliminary study of algorithm for real-time flutter monitoring
[SAE PAPER 912001] p 897 A92-45403
Recent applications of the FNS zonal Method to complex
flow problems [SAE PAPER 912003] p 789 A92-45404
Free wake analyses of a hovering rotor using panel
method
[SAE PAPER 912004] p 789 A92-45405 Flow field around thick delta wing with rounded leading
edge
[SAE PAPER 912009] p 789 A92-45409
Aerodynamic development of boundary layer control system for NAL QSTOL research aircraft 'ASKA'
[SAE PAPER 912010] p 843 A92-45410
Numerical simulation of a supersonic jet impingement
on a ground (SAE PAPER 912014) p 789 A92-45412
[SAE PAPER 912014] p 789 A92-45412 Aerodynamic characteristics near the tip of a finite wing
by a panel method
[SAE PAPER 912020] p 790 A92-45413
Aero-structural integrated design of forward swept wing
[SAE PAPER 912021] p 790 A92-45414
Demonstration of gas liquid separation under the
microgravity by aircraft KC-135 [SAE PAPER 912024] p 897 A92-45416
Experimental and numerical studies of radiation emission
from high-temperature air behind 10 km/s shock waves
[SAE PAPER 912025] p 790 A92-45417 Multidimensional Euler/Navier-Stokes analysis for
hypersonic equilibrium gas
[SAE PAPER 912026] p 790 A92-45418
A calculation of penetration of the jet issuing normally into a cross flow across a wall boundary layer
[SAE PAPER 912029] p 790 A92-45419
Functional mock-up tests for flight control system of the
NAL QSTOL research aircraft 'ASKA' [SAF PAPER 912036] p 881 A92-45422
NAL QSTOL research aircraft 'ASKA' [SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and stlicking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and stlicking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and stlicking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and stlicking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders (SAE PAPER 912043) p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows (SAE PAPER 912044) p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles (SAE PAPER 912045) p 791 A92-45429 Impact response of composite UHB propeller blades (SAE PAPER 912045) p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-4546 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilitzation [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high attitude unmanned aerial vehicle and basic properties of
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45435 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912054] p 844 A92-45488
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45435 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912054] p 844 A92-45438 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders (SAE PAPER 912043) p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows (SAE PAPER 912044) p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles (SAE PAPER 912045) p 791 A92-45429 Impact response of composite UHB propeller blades (SAE PAPER 912046) An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines (SAE PAPER 912047) p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades (SAE PAPER 912048) p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization (SAE PAPER 912052) p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle for the communication relay utilization (SAE PAPER 912052) p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material (SAE PAPER 912053) p 843 A92-45437 High-altitude lighter-than-air powered platform (SAE PAPER 912054) p 844 A92-45438 Experimental and numerical study of aerodynamic characteristics for second generation SST (SAE PAPER 912056) p 844 A92-45439 Oscillation of oblique shock waves generated in a two
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912046] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912054] p 844 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912055] p 844 A92-45438 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45433
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders (SAE PAPER 912043) p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows (SAE PAPER 912044) p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles (SAE PAPER 912045) p 791 A92-45429 Impact response of composite UHB propeller blades (SAE PAPER 912046) p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines (SAE PAPER 912047) p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades (SAE PAPER 912048) p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization (SAE PAPER 912052) p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material (SAE PAPER 912053) p 843 A92-45437 High-altitude lighter-than-air powered platform (SAE PAPER 912054) p 844 A92-45438 Experimental and numerical study of aerodynamic characteristics for second generation SST (SAE PAPER 912056) p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle (SAE PAPER 912061) p 791 A92-45443 Numerical analysis of RCS jet in hypersonic flights
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912053] p 843 A92-45430 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912054] p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912061] p 791 A92-45443 Numerical analysis of RCS jet in hypersonic flights [SAE PAPER 912063] p 791 A92-45445
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders (SAE PAPER 912043) p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows (SAE PAPER 912044) p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles (SAE PAPER 912045) p 791 A92-45429 Impact response of composite UHB propeller blades (SAE PAPER 912045) p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines (SAE PAPER 912047) p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades (SAE PAPER 912048) p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization (SAE PAPER 912052) p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material (SAE PAPER 912054) p 843 A92-45437 High-altitude lighter-than-air powered platform (SAE PAPER 912056) p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle (SAE PAPER 912061) p 791 A92-45443 Numerical analysis of RCS jet in hypersonic flights (SAE PAPER 912061) p 791 A92-45443 A simulator study of a flight reference display for
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Feasibility study on a microwave-powered unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912052] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912053] p 843 A92-45430 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912054] p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912063] p 791 A92-45443 A simulator study of a flight reference display for powered-lift STOL aircraft [SAE PAPER 912067] p 855 A92-45449
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45429 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912048] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45432 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912053] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912053] p 844 A92-45438 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912056] p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912063] p 791 A92-45443 A simulator study of a flight reference display for powered-lift STOL aircraft [SAE PAPER 912067] p 855 A92-45449 In-flight simulation of backside operating models using
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxing and takeoff run and on the preventions of the hazard [SAE PAPER 912042] p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders [SAE PAPER 912043] p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows [SAE PAPER 912044] p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles [SAE PAPER 912045] p 791 A92-45428 Impact response of composite UHB propeller blades [SAE PAPER 912045] p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines [SAE PAPER 912047] p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades [SAE PAPER 912049] p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization [SAE PAPER 912052] p 843 A92-45436 Feasibility study on a microwave-powered unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material [SAE PAPER 912052] p 843 A92-45437 High-altitude lighter-than-air powered platform [SAE PAPER 912053] p 843 A92-45430 Experimental and numerical study of aerodynamic characteristics for second generation SST [SAE PAPER 912054] p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle [SAE PAPER 912063] p 791 A92-45443 A simulator study of a flight reference display for powered-lift STOL aircraft [SAE PAPER 912067] p 855 A92-45449
[SAE PAPER 912036] p 881 A92-45422 On the possibility of freezing and sticking phenomena in a transport during the ground taxiing and takeoff run and on the preventions of the hazard (SAE PAPER 912042) p 836 A92-45426 Shock interaction induced by two hemisphere-cylinders (SAE PAPER 912043) p 790 A92-45427 Aerodynamic heating in three-dimensional shock wave turbulent boundary layer interaction induced by sweptback sharp fins in hypersonic flows (SAE PAPER 912044) p 791 A92-45428 Numerical simulations of hypersonic real-gas flows over space vehicles (SAE PAPER 912045) p 791 A92-45428 Impact response of composite UHB propeller blades (SAE PAPER 912046) p 861 A92-45430 An analysis of the effect of centrifugal force on the impact resistance of composite fan blades for turbo-fan engines (SAE PAPER 912047) p 861 A92-45431 Finite elements analysis of flexural edge wave for composite fan blades (SAE PAPER 912048) p 861 A92-45432 Feasibility study on a microwave-powered unmanned aerial vehicle for the communication relay utilization (SAE PAPER 912052) p 843 A92-45436 Structural concept of main wings of high altitude unmanned aerial vehicle and basic properties of thermoplastic composites as candidate material (SAE PAPER 912054) p 844 A92-45437 High-altitude lighter-than-air powered platform (SAE PAPER 912054) p 844 A92-45439 Oscillation of oblique shock waves generated in a two dimensional asymmetric nozzle (SAE PAPER 912061) p 791 A92-45443 Numerical analysis of RCS jet in hypersonic flights (SAE PAPER 912067) p 855 A92-45449 In-flight simulation of backside operating models using direct lift controller

A design of strongly stabilizing controller [SAE PAPER 912081] p 917 A92-45456	ı
Predicted pressure distribution on a prop-fan blade	í
through Euler analysis p 810 A92-46791 Wing design for hanggliders having minimum induced	
drag p 811 A92-46814 Prediction of dynamic hub load of a rotor executing	
multiple sinusoidal blade pitch variations	1
p 846 A92-46921 Simple diagnosis for the quality of generated grid	i
systems p 919 A92-47069 Analysis of motion of airfoil flying over wavy-wall surface	ì
(lifting surface method) p 818 A92-47100	
A finite difference solution of the Euler equations on non-body-fitted Cartesian grids p 818 A92-47153	[
Numerical experiments on unsteady shock reflection processes using the thin-layer Navier-Stokes equations	[
p 818 A92-47155 Strength evaluation and safety of machine/structure. III	i
- Case examples on strength and safety evaluation of	(
machine/structure 3.2 aircraft (airframe) p 882 A92-47303	(
A higher-order accurate Navier-Stokes solver for transonic and supersonic flows in turbomachinery	[
[AIAA PAPER 92-3044] p 822 A92-48704 Application of non-reflecting boundary conditions to	f (
three-dimensional Euler equation calculations for thick strut cascades	[
[AIAA PAPER 92-3045] p 822 A92-48705 Numerical investigation of surge and rotating stall in	i. [
multistage axial compressors [AIAA PAPER 92-3193] p 825 A92-48804	
Numerical solutions of unsteady oscillating flows past an airfoil	(
[AIAA PAPER 92-3212] p 825 A92-48817 A scramjet nozzle experiment with hypersonic external	t
flow	[
[AIAA PAPER 92-3289] p 864 A92-48878 Experimental validation of scramjet nozzle performance	t [
[AIAA PAPER 92-3290] p 864 A92-48879 Derivation of ABCD system matrices from nonlinear	a
dynamic simulation of jet engines [AIAA PAPER 92-3319] p 923 A92-48903	į
Combustion of solid fueled ramjet. I [AIAA PAPER 92-3727] p 894 A92-49105	г [
Combustion of solid fueled ramjet. II [AIAA PAPER 92-3728] p 894 A92-49106	
Conceptual study of separated core ultra high bypass engine	i
[AIAA PAPER 92-3775] p 867 A92-49119 Design and off-design point characteristics of Separated	ſ
Core Ultra High Bypass Engine (SCUBE) [AIAA PAPER 92-3776] p 867 A92-49120	[
Air ejector experiments using the two-dimensional supersonic cascade tunnel: Zero secondary flow	f
performance [NAL-TM-632] p 887 N92-28829	(
Upgrading the data processing section of the NAL Gust Wind Tunnel data processing system	c [
[NAL-TM-635] p 888 N92-28833	t
Replacement of the NAL high pressure air storage system	(
[NAL-TM-634] p 888 N92-28835 Quaternion and Euler angles in kinematics	ir
[NAL-TM-636] p 909 N92-28836 Aerodynamic characteristics obtained from alpha sweep	ſ
test of the quiet STOL experimental aircraft ASKA [NAL-TR-1112] p 853 N92-28901	fi [
K	_
OREA, REPUBLIC OF Prediction of rotor unsteady airloads using vortex	fa [
filament theory [AIAA PAPER 92-2610] p 792 A92-45484	u
Time accurate computation of unsteady transonic flows around an airfoil with oscillating flap on dynamic grid	[
[AIAA PAPER 92-2733] p 805 A92-45567 A study of the flammability limit of the backward facing	(
step flow combustion [AIAA PAPER 92-3846] p 895 A92-49136	r
N	[
ETHERLANDS	v
Numerical investigation into high-angle-of-attack leading-edge vortex flow	[
[AIAA PAPER 92-2600] p 791 A92-45477 The design of a system of codes for industrial	1
calculations of flows around aircraft and other complex	Ċ

[AIAA PAPER 92-2619]

p 917 A92-45492

[NLR-TP-91062-U-PT-1]

Comparison of interferometric measurements with 3-D Euler computations for circular cones in supersonic flow AIAA PAPER 92-2691] p 800 A92-45538

New concepts for multi-block grid generation for flow AIAA PAPER 92-2691] domains around complex aerodynamic configurations Aircraft simulation and pilot proficiency: From surrogate lying towards effective training p 884 N92-28532 The basic research simulator programme and the ndustrial and aerospace community: Opportunities for cooperative research p 887 N92-28579 LR-662] Inverse control problems: Mathematical preliminaries. system theoretical approaches, and their applications to ircraft dynamics LR-665] p 923 N92-28581 Hyperbolic grid generation with BEM source terms NLR-TP-90334-U] p 923 N92-28635 A simple and low cost system to measure delay times pneumatic systems NLR-TP-90174-U] p 859 N92-28644 The use of load enhancement factors in the certification of composite aircraft structures NLR-TP-90068-U] p 852 N92-28649 Some longitudinal handling qualities design guidelines NLR-TP-90068-U1 or active control technology transport aircraft p 878 N92-28652 NLR-TP-90129-U1 Response of helicopters to gusts p 879 N92-28653 NLR-TP-90159-U] Potential applications of laser Doppler anemometry for n-flight measurements NLŘ-TP-90163-U] p 859 N92-28654 Application of knowledge-based systems for diagnosis aircraft systems NLR-TP-90192-U] p 837 N92-28655 Analysis of results of an Euler-equation method applied o leading-edge vortex flow p 827 N92-28657 NLR-TP-90368-U] Comparison of LDA and LTA applications for propeller ests in wind tunnels NLR-MP-88031-U] p 827 N92-28658 Calculation of unsteady subsonic and supersonic flow bout oscillating wings and bodies by new panel NLR-TP-89119-U1 p 827 N92-28659 Constrained spanload optimization for minimum drag of nulti-lifting-surface configurations NLR-TP-89126-U1 p 828 N92-28660 The windtunnel as a tool for laminar flow research p 887 N92-28661 NLR-TP-90145-U] Instrumentation requirements for laminar flow research the NLR high speed wind tunnel HST p 887 N92-28669 NLR-TP-89158-U] LAH-main rotor model test at the DNW NLR-TP-90305-U] NLR-TP-90305-U] p 852 N92-28687 Atmospheric turbulence spectra and correlation unctions NLR-TP-89217-U] p 915 N92-28689 Development and validation of a characteristic boundary condition for a cell-centered Euler method NLR-TP-90144-U] p 828 N92-28692 Turbulence modeling: Survey of activities in Belgium and ne Netherlands, and appraisal of the status and a view n the prospects p 908 N92-28694 NLR-TP-90184-U1 Experimental validation of a line-duct acoustics model cluding flow p 927 N92-28695 NLR-TP-90223-U] Wave drag determination in the transonic full-potential low code MATRICS NLR-TP-90062-U] p 828 N92-28709 Diffuser casing upgrade for an advanced turbofan NLR-TP-90097-U] p 870 N92-2 p 870 N92-28711 Boundary conditions for Euler equations at internal block aces of multi-block domains using local grid refinement NLR-TP-90134-U] p 908 N92-28712 Flow gradient corrections on hot-wire measurements sing an X-wire probe NLŘ-TP-90255-U) p 829 N92-28713 S-76B certification for vertical take-off and landing perations from confined areas NLR-TP-90286-U1 p 852 N92-28714 NARSIM: A real-time simulator for air traffic control esearch NLR-TP-90147-U] p 888 N92-29204 Short cracks and durability analysis of the Fokker 100 ving/fuselage structure NLR-TP-90336-U] p 910 N92-29603 Hyperbolic grid generation control by panel methods NLR-TP-91061-U] p 924 N92-29604 NLR-TP-91061-U] European studies to investigate the feasibility of using 000 ft vertical separation minima above FL 290. Part 1: overview of organisation, techniques employed, and conclusions

p 841 N92-29605

NEW ZEALAND	
Application of VME-technology on an airborne data link	ASTOVL propulsion systems con
processor unit	choice
[NLR-MP-88040-U] p 841 N92-29615 Results of a flight simulator experiment to establish	Recent developments at the Sho facility
handling quality guidelines for the design of future transport aircraft	Configuration effects on the ing
[NLR-MP-88044-U] p 854 N92-29616	the engine intake Hot-gas reingestion - Engine res
On the optimization of windshear warning and guidance systems	Production and management of in
[NLR-TP-90196-U] p 837 N92-29703	Prediction and measurement of je ASTOVL aircraft
Evaluation of measured-boundary-condition methods for	A progress report on ASTOVL or
3D subsonic wall interference [NLR-TR-88072-U] p 832 N92-29884	under the VAAC programme ASTOVL engine control
A method for computing the 3-dimensional flow about	Integrated flight control syst
wings with leading-edge vortex separation. Part 2:	considerations for future aircraft co
Description of computer program VORSEP [NLR-TR-86006-U] p 833 N92-29916	Ground surface erosion - British
Ageing aircraft research in the Netherlands	and experimental studies
p 838 N92-30129 NEW ZEALAND	The experimental and compu impingement flowfields with referer
Getting test items to measure knowledge at the level	performance
of complexity which licensing authorities desire - Another dimension to test validity p 835 A92-45080	Application of an unstructured N multi-element airfoils operating at
Thin-airfoil correction for panel methods	conditions
p 811 A92-46811	[AIAA PAPER 92-2638] Prediction of the viscous tra
Mandatory psychological testing of pilots as a	performance of supercritical aerofol
requirement for licensing in Norway?	[AIAA PAPER 92-2653]
p 835 A92-45081	Effect of flow rate on loss mecha centrifugal impeller
P	The relationship between tensile
•	of unidirectional composites Calculation of potential flow a
POLAND Safety vs. economy, system-theoretic approach to the	discrete vortex method
problem analysis p 916 A92-45002	Fibre optic rotary position sens propulsion controls
Selected models of aircraft navigation space p 839 A92-45373	The use of optical sensors and
Radioaltimeter RWL-750 p 855 A92-45374	turbine engines Propulsion system performance a
Two-point optimization of complete three-dimensional airplane configuration	Mach air breathing flight
[AIAA PAPER 92-2618] p 844 A92-45491	The inviscid compressible G three-dimensional boundary layers
Mathematical modeling of the flight of passenger aircraft	Through the looking glass
in the case of engine failure p 875 A92-47777 Calculation of the aerodynamic derivatives of aircraft	The application of particle image short-duration transonic annular turb
in the supersonic region using the Mach box method	[ASME PAPER 91-GT-221]
p 875 A92-47779 Total losses in turbulent flows inside conical diffusers	Effect of model cooling on period
p 819 A92-47782	Relative energy concepts in helica
Modeling of the control systems of rotary wing aircraft (Review) p 875 A92-47783	Mesh adaptivity with the quadtree
Mathematical modeling of the effect of windshear on	Mesil adaptivity with the quadree
the dynamics of a landing aircraft p 875 A92-47784 Aircraft stabilization at large angles of attack	The construction, application
p 875 A92-47785	three-dimensional hybrid meshes Generation of unstructured gr
A new method of helicopter rotor blade motion control p 875 A92-47786	multi-block environment
Concept of a one-dimensional model of the dynamic	CIS engines. I - The range reveal
behavior of a gas turbine p 862 A92-47791	US Navy revisits escape modules
9	Experience with the Johnson-King a transonic turbine cascade flow so
•	Time to an actionation from infrare
SAUDI ARABIA Aircraft spoiler effects under wind shear	Time-to-go estimation from infrare
[AIAA PAPER 92-2642] p 796 A92-45509	An integrated navigation syst federated Kalman filtering
SPAIN Optimum cruise lift coefficient in initial design of jet	Robustness characteristics of fa
aircraft p 845 A92-46806	controllers for high-performance
Patch-independent structured multiblock grids for CFD computations p 919 A92-47078	control surfaces Applications of silicon hybrid mu
SWEDEN	avionics
Generation of efficient multiblock grids for Navier-Stokes	Practical considerations in design
computations p 919 A92-47081 A manufacturer's approach to ensure long term	Inlet distortion effects in aircra
structural integrity p 838 N92-30133	integration Fundamentals of structural optimis
SWITZERLAND Mesh adaption for 2D transsonic Euler flows on	·
unstructured meshes p 816 A92-47038	Validation of simulation systems for testing
11	Harrier GR MK 5/7 mission sime
U	Air Force Initial validation of a R/D simulator
UNITED KINGDOM	motion
Assembling the future p 783 A92-44895	Effective cueing during approach Comparison with flight
The development of an intelligent human factors data base as an aid for the investigation of aircraft accidents	Report on the workshop on Ion
p 928 A92-44994 The effect on aircraft evacuations of passenger	Beam Assisted Deposition [AD-A250561]
TOPOGRAPH OF AUTOMIT EVALUATIONS OF DASSENGER	[ND-NESOSOI]

p 834 A92-44998

p 783 A92-45302

p 842 A92-45311

figuration and concept p 842 A92-45312 eburyness STOVL test p 881 A92-45314 estion of hot gas into p 842 A92-45315 ponse considerations p 860 A92-45317 et flowfield features for p 787 A92-45318 ontrol concept studies p 871 A92-45319 p 860 A92-45321 tems Architectural ncepts p 872 A92-45322 Aerospace test facility p 881 A92-45323 itational study of jet nce to VSTOL aircraft p 787 A92-45324 avier-Stokes solver to transonic maneuver p 796 A92-45507 ansonic aerodynamic il sections p 805 A92-45569 nisms in a backswept p 897 A92-45606 and flexural strength p 891 A92-45629 round airfoils using a p 808 A92-45827 sors for vehicle and p 855 A92-46243 signal processing gas p 856 A92-46247 and integration for high p 862 A92-46429 Roertler problem in p 809 A92-46441 p 856 A92-46449 velocimetry (PIV) in a bine cascade p 899 A92-46825 lic transonic flow p 813 A92-46900 opter dynamics p 846 A92-46925 method p 816 A92-47041 and interpretation of p 919 A92-47089 ids within a hybrid p 818 A92-47090 p 786 A92-47821 p 849 A92-47975 turbulence model in lver p 821 A92-48207 ed images p 840 A92-48308 tem manager using p 858 A92-48477 st-sampling digital PI aircraft with impaired p 877 A92-48496 ulti-chip modules to p 859 N92-28379 ing the engine cycle p 869 N92-28460 aft propulsion system p 869 N92-28464 sation p 851 N92-28470 or aircraft acceptance p 852 N92-28531 ulators for the Royal p 885 N92-28540 with large amplitude p 886 N92-28546 ch and touchdown p 886 N92-28552 Implantation and Ion p 927 N92-28923 Turbulent spot generation and growth rates in a transonic boundary layer [AD-A250221] p 909 N92-29118 Boundary layer induced noise in aircraft p 927 N92-29201 ICUED/A-AFRO/TR-181 Aeronautical Engineering Group publications, 1950 -[AERO-REPT-8907] p 910 N92-29683

USSR

Aerospace plane hydrogen scramjet boosting [SAE PAPER 912071] p 891 A92-45451 Effect of a fan of rarefaction waves on the development of disturbances in a supersonic boundary layer

p 809 A92-46519 Stability and inherent precision of two methods for solving motion and ablation equations for fireball-forming bodies in the earth atmosphere p 929 A92-46595 Smooth solutions for transonic gasdynamic equations (ISBN 5-02-029345-8) SBN 5-02-029345-8] p 809 A92-46626 The method of determinant equations in the applied

theory of optimal systems - Systems with 'rigid' constraints and with fixed boundary conditions p 917 A92-46629 Enhancing the performance characteristics of engine fuels by means of surfactant additives

p 892 A92-46631 Oscillations of balloon-flight altitude

p 836 A92-46660 The flow pattern and external heat transfer investigation for gas turbine vanes end surfaces

[AIAA PAPER 92-3071] p 903 A92-48722 Experimental investigation of liquid carbonhydrogen fuel combustion in channel at supersonic velocities [AIAA PAPER 92-3429]

p 894 A92-48986 Similarity relations for calculating three-dimensional chemically nonequilibrium viscous flows

p 827 A92-49188

behaviour and smoke in the cabin

Evolution of ASTOVL aircraft design

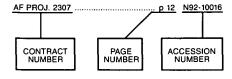
(ISBN 0-903409-68-2)

engine for Harrier

International Powered Lift Conference, London, England, Aug, 29-31, 1990, Proceedings

VSTOL engine design evolution - Growth of the Pegasus ngine for Harrier p 860 A92-45306

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under the contract are shown. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

AF PROJ. 2308	p 896	N92-29580
AF PROJ. 3405	p 888	N92-29709
AF-AFOSR-0004-87	p 883	N92-28388
AF-AFOSR-0131-90	p 829	N92-28865
AF-AFOSR-0188-90	p 896	N92-29580
AF-AFOSR-0427-89	p 909	N92-29118
AF-AFOSR-0502-89	p 830	N92-28888
AF-AFOSR-86-0112	p 813	A92-46897
AF-AFOSR-86-0266	p 812	A92-46882
	p 811	A92-46805
	p 812	A92-46882
AF-AFOSR-90-0131	p 794	A92-45498
	p 804	A92-45563
AF-AFOSR-91-0022	p 803	A92-45559
ATD-90-STI-6401	p 878	N92-28584
DA PROJ. 1L1-62211-A-47-A	p 908	N92-28434
	р 909	N92-29105
	p 910	N92-29136
DAAG29-84-K-0131	p 813	A92-46901
DAAH01-90-C-0373	p 894	A92-48848
DAAK51-79-C-0037	p 848	A92-47408
DAAL03-86-G-0013	p 883	A92-48908
DAAL03-86-G-0044	p 825	A92-48897
B/ 0 1200 00 G 00 1 1	p 909	N92-28879
	p 911	N92-29933
DAAL03-87-G-0011	p 799	A92-45536
DAAL03-87-K-0010	p 813	A92-46895
	p 846	A92-46922
	p 875	A92-46933
	p 874	A92-46933
DAAL03-88-C-0002		
	p 813	A92-46935
DAAL03-88-C-0003	p 807	A92-45588
	p 814	A92-46947
DAAL03-88-C-0004	p 847	A92-46927
DAAL03-89-C-0004	p 794	A92-45496
DAAL03-90-G-0021	p 813	A92-46895
DASG60-87-C-0042	p 896	A92-45130
DE-AC04-76DP-00789	p 812	A92-46890
	p 812	A92-46891
	p 817	A92-47057
	p 900	A92-47071
DE-AC05-84OR-21400	p 909	N92-28814
DE-FG05-91ER-81207	p 794	A92-45496
DRET-89-080	p 820	A92-47876
DRET-89-1433	p 815	A92-46954
DRET-89-34-001	p 908	N92-28788
DRE1-09-34-001		
	p 829	N92-28789
DTFA-02-90-C-90583	p 916	A92-44982
DTFA01-90-Z-02005	p 915	A92-46788
DTFA03-87-A-00021	p 836	A92-46784
DTRS-57-88-C-0078	p 855	A92-44923
D1110-37-00-0-0070	h 000	MUE-440E0

DTRS-57-89-C-00006	p 854	N92-29180
FAA-ADS-210	p 855	A92-44923
F04606-89-D-0036	p 870	N92-28686
F04704-92-C-0006	p 925	A92-47028
F08635-89-C-0196	p 903	A92-48844
F09063-85-G-3104	p 810	A92-46781
F33615-86-C-3606	p 876	A92-48491
F20615 07 D 1451	p 876	A92-48492 A92-48475
F33615-87-D-1451F33615-88-C-0003	p 858 p 923	N92-29188
F33615-88-C-0014	p 888	N92-29505
F33615-88-C-1713	p 922	A92-48518
F33615-88-C-1739	p 920	A92-48220
F33615-88-C-2816	p 858 p 868	A92-48567 N92-28294
F33615-88-C-2816	p 895	N92-28398
F33615-88-C-3612	p 916	A92-44915
F33615-90-C-2028	p 825	A92-48906
500057 04 C 0400	p 904	A92-48907
F33657-81-C-2108	p 845 p 824	A92-46800 A92-48742
F49620-87-K-0003	p 873	A92-46752
F49620-88-C-0006	p 813	A92-46913
F49620-88-C-0053	p 921	A92-48502
F49620-90-C-0070	p 893	A92-48846
F49620-90-C-0076	р 795 р 804	A92-45500 A92-45563
F49620-92-J-0189	p 803	A92-45557
MDA903-87-C-0523	p 888	N92-29709
MDA972-88-C-0047	p 892	A92-46838
MOESC-02252105	p 790	A92-45417
MOESC 02229105	p 822 p 790	A92-48704 A92-45417
MOESC-03238105 MOESC-03238202	p 822	A92-45417 A92-48704
MOESC-03750110	p 822	A92-48704
MOESC-61420021	p 790	A92-45417
MOESC-62850016	p 843	A92-45397
MOESC-63302022	p 790	A92-45417 A92-45524
NAGW-1022 NAGW-1072	p 798	
	p 796 p 803	A92-45510 A92-45557
NAGW-1195	p 803 p 918	
	p 803 p 918 p 798	A92-45557 A92-46817 A92-45524
NAGW-1195NAGW-1331	p 803 p 918 p 798 p 892	A92-45557 A92-46817 A92-45524 A92-47835
NAGW-1195	p 803 p 918 p 798 p 892 p 809	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431
NAGW-1195NAGW-1331	p 803 p 918 p 798 p 892	A92-45557 A92-46817 A92-45524 A92-47835
NAGW-1195 NAGW-1331 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931
NAGW-1195 NAGW-1331 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1180 NAG1-1188	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900 p 910	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1188 NAG1-1188 NAG1-1192	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900 p 910 p 821	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1180 NAG1-1188	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900 p 910	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1288 NAG1-1288 NAG1-1288 NAG1-1258	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900 p 910 p 821 p 808 p 903 p 854	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-45598 A92-4894 N92-30209
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-180 NAG1-1188 NAG1-1192 NAG1-128 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-1380	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 852 p 900 p 910 p 821 p 808 p 903 p 854 p 879	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-47892 A92-47892 A92-48844 N92-30209 N92-29654
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-321	p 803 p 918 p 798 p 892 p 809 p 879 p 830 p 910 p 821 p 808 p 908 p 954 p 879 p 873	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-45844 N92-30209 N92-29654 A92-46751
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-180 NAG1-1188 NAG1-1192 NAG1-128 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-1380	p 803 p 918 p 798 p 892 p 809 p 874 p 830 p 910 p 810 p 808 p 903 p 854 p 808 p 9854 p 873 p 800	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-48844 N92-30209 N92-29654 A92-46751 A92-45540
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-321	P 803 P 918 P 798 P 892 P 809 P 874 P 830 P 852 P 900 P 910 P 821 P 808 P 903 P 873 P 873 P 873 P 812 P 812	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-45844 N92-30209 N92-29654 A92-46751
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1321 NAG1-372 NAG1-372	p 803 p 918 p 792 p 809 p 874 p 830 p 852 p 910 p 821 p 808 p 934 p 879 p 873 p 802 p 811 p 801 p 811 p 811	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45844 N92-30209 N92-29654 A92-46551 A92-46887 N92-29445 A92-46583
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-321 NAG1-372 NAG1-372	P 803 P 918 P 792 P 809 P 874 P 830 P 852 P 901 P 821 P 808 P 873 P 879 P 873 P 800 P 811 P 824 P 827	A92-45557 A92-46817 A92-46524 A92-46331 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-45594 A92-4651 A92-4651 A92-465540 A92-465540 A92-46555 N92-29445 A92-465835 N92-28511
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1321 NAG1-372 NAG1-372	p 803 p 918 p 798 p 892 p 809 p 874 p 850 p 900 p 910 p 821 p 803 p 854 p 860 p 873 p 860 p 812 p 831 p 827 p 924 p 827 p 798	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-47892 A92-47892 A92-45598 A92-46844 N92-30209 N92-29654 A92-46540 A92-46887 N92-29445 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835 A92-45835
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-1380 NAG1-372 NAG1-372 NAG1-421 NAG1-681 NAG1-793	p 803 p 918 p 798 p 892 p 809 p 874 p 852 p 900 p 910 p 852 p 903 p 857 p 808 p 873 p 873 p 801 p 924 p 821 p 924 p 828 p 828 p 831	A92-45557 A92-46817 A92-46524 A92-46331 A92-46931 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45598 A92-45594 A92-4651 A92-4651 A92-465540 A92-465540 A92-46555 N92-29445 A92-465835 N92-28511
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-372 NAG1-372 NAG1-421 NAG1-421 NAG1-681 NAG1-793	p 803 p 918 p 798 p 892 p 809 p 874 p 850 p 900 p 910 p 821 p 803 p 854 p 860 p 873 p 860 p 812 p 831 p 827 p 924 p 827 p 798	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47128 A92-47892 A92-45598 A92-48844 N92-30209 N92-29654 A92-46540 A92-46540 A92-46587 N92-29455 A92-45550 N92-28511 A92-45835 N92-28511 A92-45525 N92-29657
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-372 NAG1-372 NAG1-421 NAG1-681 NAG1-793 NAG1-816 NAG1-816 NAG1-872	P 803 P 918 P 798 P 892 P 809 P 830 P 852 P 9010 P 821 P 803 P 854 P 873 P 800 P 812 P 873 P 824 P 878 P 878 P 878 P 878 P 879 P 879	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-47892 A92-45598 A92-48844 N92-30209 N92-29654 A92-465807 N92-29455 N92-28511 A92-45525 N92-29657 A92-48923 N92-28718 A92-49064
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1328 NAG1-321 NAG1-321 NAG1-321 NAG1-372 NAG1-793 NAG1-795 NAG1-816 NAG1-872 NAG1-872 NAGW-674 NAGW-687	P 803 P 918 P 989 P 892 P 809 P 874 P 852 P 900 P 821 P 808 P 879 P 800 P 812 P 800 P 812 P 801 P 827 P 798 P 827 P 798 P 827 P 798 P 840 P 840	A92-45557 A92-46817 A92-46524 A92-47835 A92-46931 N92-29329 N92-28720 A92-47128 A92-47128 A92-47598 A92-48598 A92-48594 A92-46571 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-28518 A92-28518 A92-28518 A92-28518 A92-28718 A92-28718 A92-28361
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1086 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1358 NAG1-1350 NAG1-321 NAG1-372 NAG1-421 NAG1-681 NAG1-795 NAG1-875 NAG1-875 NAG1-876 NAG1-877 NAG1-877 NAG1-877 NAG1-987 NAG1-987 NAG1-987 NAG1-987	P 803 P 918 P 892 P 809 P 850 P 850 P 850 P 900 P 910 P 821 P 903 P 854 P 803 P 873 P 804 P 803 P 804 P 804 P 805 P 805 P 805 P 805 P 806 P 806	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-45598 A92-48844 N92-30209 N92-29654 A92-46557 A92-45540 A92-46887 N92-29445 A92-48835 N92-28811 A92-45525 N92-28811 A92-45525 N92-28811 A92-45548 A92-48823 N92-28718 A92-49064 A92-28718 A92-49064 A92-28361 A92-45478
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1328 NAG1-321 NAG1-321 NAG1-321 NAG1-372 NAG1-793 NAG1-795 NAG1-816 NAG1-872 NAG1-872 NAGW-674 NAGW-687	P 803 P 918 P 989 P 892 P 809 P 874 P 852 P 900 P 821 P 808 P 879 P 800 P 812 P 800 P 812 P 801 P 827 P 798 P 827 P 798 P 827 P 798 P 840 P 840	A92-45557 A92-46817 A92-46524 A92-47835 A92-46931 N92-29329 N92-28720 A92-47128 A92-47128 A92-47598 A92-48598 A92-48594 A92-46571 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-46887 A92-28518 A92-28518 A92-28518 A92-28518 A92-28718 A92-28718 A92-28361
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1086 NAG1-1180 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1358 NAG1-1350 NAG1-321 NAG1-372 NAG1-421 NAG1-681 NAG1-795 NAG1-879 NAG1-879 NAG1-879 NAG1-879 NAG1-987 NAG1-994 NAG2-243 NAG2-596 NAG2-607	P 803 P 918 P 892 P 809 P 830 P 852 P 800 P 910 P 910 P 921 P 821 P 803 P 804 P 803 P 804 P 803 P 804 P 804 P 804 P 804 P 805 P 806 P 806 P 906 P 906 P 906 P 906 P 906 P 906 P 906 P 906 P 907 P 876 P 976 P 876 P 976 P 876 P 976 P 876 P 976 P 976 P 977 P 876 P 977 P 876 P 977 P 876 P 977 P 876 P 977 P 876 P 977 P 876 P 977 P 877 P 977 P 877 P 977 P 977	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-48844 N92-30209 N92-29654 A92-46540 A92-46887 N92-298511 A92-45540 A92-46817 A92-4823
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1390 NAG1-372 NAG1-372 NAG1-421 NAG1-372 NAG1-81 NAG1-793 NAG1-81 NAG1-81 NAG1-872 NAG1-872 NAG1-894 NAG2-243 NAG2-596 NAG2-607 NAG2-605	P 803 P 918 P 892 P 809 P 809 P 809 P 809 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 801 P 800 P 801 P 802 P 802 P 802 P 802 P 802 P 802 P 802 P 803 P 804 P 804 P 805 P 805 P 806 P 806 P 806 P 807 P 806 P 807 P 806 P 807 P 807 P 808 P 808	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-4598 A92-46817 A92-46807 A92-46807 A92-46807 A92-48823 N92-2818 A92-45548 A92-46548 A92-4684
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1321 NAG1-321 NAG1-372 NAG1-421 NAG1-681 NAG1-795 NAG1-816 NAG1-994 NAG1-997 NAG1-997 NAG1-994 NAG2-243 NAG2-596 NAG2-665 NAG2-1124	P 803 P 918 P 892 P 809 P 874 P 830 P 874 P 800 P 821 P 900 P 821 P 800 P 812 P 800 P 812 P 813 P 800 P 812 P 903 P 840 P 827 P 798 P 840 P 827 P 798 P 840 P 840	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45844 N92-30209 N92-29654 A92-46540 A92-46887 A92-46887 A92-48846 N92-29657 A92-48848 N92-29657 A92-48848 A92-46817 A92-45478 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-468484 A92-46847 A92-46894 A92-46894 A92-48734
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1086 NAG1-1180 NAG1-1188 NAG1-1192 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1388 NAG1-1380 NAG1-321 NAG1-372 NAG1-421 NAG1-681 NAG1-795 NAG1-816 NAG1-879 NAG1-879 NAG1-879 NAG1-987 NAG1-994 NAG2-243 NAG2-665 NAG2-665 NAG3-1124 NAG3-1165	P 803 P 918 P 892 P 809 P 852 P 809 P 852 P 900 P 910 P 821 P 803 P 854 P 803 P 873 P 804 P 803 P 804 P 804 P 805 P 805 P 806 P 906 P 906 P 906 P 906 P 906 P 906 P 907 P 879 P 879	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-48844 N92-30209 N92-29654 A92-46571 A92-45540 A92-46887 N92-29445 A92-48835 N92-2811 A92-45525 N92-28611 A92-45478 A92-48684 A92-4874 A92-4874 A92-4874 A92-48734 A92-468974 A92-468974 A92-468973 A92-4689734 A92-30207
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1321 NAG1-321 NAG1-372 NAG1-421 NAG1-681 NAG1-795 NAG1-816 NAG1-994 NAG1-997 NAG1-997 NAG1-994 NAG2-243 NAG2-596 NAG2-665 NAG2-1124	P 803 P 918 P 892 P 809 P 874 P 830 P 874 P 800 P 821 P 900 P 821 P 800 P 812 P 800 P 812 P 813 P 800 P 812 P 903 P 840 P 827 P 798 P 840 P 827 P 798 P 840 P 840	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-45844 N92-30209 N92-29654 A92-46540 A92-46887 A92-46887 A92-48846 N92-29657 A92-48848 N92-29657 A92-48848 A92-46817 A92-45478 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-46847 A92-468484 A92-46847 A92-46894 A92-46894 A92-48734
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1180 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1380 NAG1-358 NAG1-372 NAG1-421 NAG1-372 NAG1-421 NAG1-681 NAG1-793 NAG1-793 NAG1-816 NAG1-872 NAG1-874 NAG2-243 NAG2-2566 NAG2-667 NAG2-665 NAG3-1125 NAG3-1165 NAG3-1165	P 803 P 918 P 892 P 809 P 809 P 809 P 800 P 810 P 800 P 810 P 800 P 812 P 800 P 800 P 812 P 800 P 812 P 800 P 800 P 812 P 800 P 800	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-45598 A92-48844 N92-30209 N92-29654 A92-46571 A92-45540 A92-46887 N92-29445 A92-48835 N92-2811 A92-45525 N92-2811 A92-45540 A92-46894 A92-4874 A92-4874 A92-4874 A92-48734 A92-48734 A92-30207 N92-29361 A92-49126 A92-49128
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-1358 NAG1-1358 NAG1-1360 NAG1-372 NAG1-81 NAG1-97 NAG1-97 NAG1-97 NAG1-981 NAG1-994 NAG2-243 NAG2-243 NAG2-256 NAG3-1126 NAG2-865 NAG3-1126 NAG3-841 NAG3-881 NAG3-881 NAG3-881 NAG3-881 NASA ORDER C-30002-M NASA-18240	P 803 P 918 P 892 P 809 P 809 P 809 P 800 P 910 P 821 P 800 P 910 P 821 P 803 P 804 P 873 P 806 P 907 P 806 P 907 P 807 P 808	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-48844 N92-30209 N92-29654 A92-46545 A92-46545 A92-46897 N92-2945 A92-48810 A92-48935 A92-48934 A92-48936 A92-48936 A92-48936 A92-49126 A92-49128 A92-49128 A92-48264
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1188 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-1358 NAG1-1358 NAG1-1360 NAG1-372 NAG1-372 NAG1-816 NAG1-816 NAG1-872 NAG1-894 NAG2-243 NAG2-596 NAG2-607 NAG2-665 NAG3-1124 NAG3-811 NAG3-816 NAG3-811 NAG3-816 NAG3-8172 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-8186 NAG3-811 NASA ORDER C-30002-M NAS1-18240 NAS1-18240 NAS1-18240	P 803 P 918 P 809	A92-45557 A92-46817 A92-45524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47128 N92-29830 A92-47892 A92-47598 A92-45898 A92-48844 N92-30209 N92-29654 A92-46587 A92-45540 A92-46887 A92-45835 N92-28511 A92-45540 A92-46817 A92-46807 A92-46935 A92-48934 A92-49128 A92-49128 A92-49128 A92-49126 A92-49128 A92-49126 A92-49128 A92-49126 A92-49128 A92-49539
NAGW-1195 NAGW-674 NAG1-1027 NAG1-1065 NAG1-1087 NAG1-1180 NAG1-1180 NAG1-1188 NAG1-1278 NAG1-1278 NAG1-1278 NAG1-1288 NAG1-1288 NAG1-1358 NAG1-1358 NAG1-1358 NAG1-1360 NAG1-372 NAG1-81 NAG1-97 NAG1-97 NAG1-97 NAG1-981 NAG1-994 NAG2-243 NAG2-243 NAG2-256 NAG3-1126 NAG2-865 NAG3-1126 NAG3-841 NAG3-881 NAG3-881 NAG3-881 NAG3-881 NASA ORDER C-30002-M NASA-18240	P 803 P 918 P 892 P 809 P 809 P 809 P 800 P 910 P 821 P 800 P 910 P 821 P 803 P 804 P 873 P 806 P 907 P 806 P 907 P 807 P 808	A92-45557 A92-46817 A92-46524 A92-47835 A92-46431 N92-29329 N92-28720 A92-47892 A92-47892 A92-47892 A92-47892 A92-47892 A92-48844 N92-30209 N92-29654 A92-46545 A92-46545 A92-46897 N92-2945 A92-48810 A92-48935 A92-48934 A92-48936 A92-48936 A92-48936 A92-49126 A92-49128 A92-49128 A92-48264

NAS1-19000 p 802 A92-45552

p 803 A92-45560

	p 816	A92-46959
NAS1-19023	p 814	A92-46951
NAS1-19060	p 927	N92-28556
NAS1-19136	p 815	A92-46957
NAS1-19237 NAS1-19320	p 816	A92-46985 A92-48849
NAS1-19320 NAS2-12343	p 890 p 846	A92-46924
NAS2-12635	p 815	A92-46953
NAS2-12722	p 878	N92-28584
NAS2-12787 NAS2-12961	p 810	A92-46787
NAS2-12961 NAS2-12989	p 917 p 803	A92-45489 A92-45555
NAS2-13079	p 814	A92-46952
NAS2-13127	p 885	N92-28545
NAS2-131313 NAS2-13155	p 871	N92-29427
NAS3-25266	p 811 p 800	A92-46798 A92-45541
	p 887	N92-28673
	p 831	N92-29402
NAS3-25344	p 856	A92-46244
NAS3-25421 NAS3-25425	p 905 p 823	A92-48937 A92-48723
NAS3-25454	p 905	A92-48936
NAS3-25455	p 905	A92-48939
NAS3-25952	p 903	A92-48735
NAS8-37814 NAS8-38892	p 820 p 821	A92-47872 A92-47894
NCA2-329	p 915	A92-47894 A92-46262
NCC1-140	p 892	A92-47835
NCC1-141	p 888	N92-29352
NCC1-153 NCC1-22	p 824 p 798	A92-48741 A92-45524
NCC1-46	p 792	A92-45324
NCC2-106	p 873	A92-46742
NCC2-237	p 833	A92-44931
NCC2-458	p 874 p 865	A92-46802 A92-48984
NCC2-536	p 802	A92-45550
11000.55	p 832	N92-29691
NCC2-55	p 805 p 816	A92-45568 A92-46986
NCC2-583	p 808	A92-45845
NCC2-716 NCC2-729	p 888 p 793	N92-29655 A92-45493
NCC2-729	p 796	A92-45493 A92-45508
NCC2-746	p 865	A92-48984
NGT-50341	p 797	A92-45517
NGT-50400 NIVR-RB-311.1-01501-N	p 906 p 828	A92-49064 N92-28709
NIVR-01101-N	p 828	N92-28660
NIVR-01502-N	p 829	N92-28713
NIVR-01604-N	p 908 p 837	N92-28712 N92-28655
NIVR-01803-N	p 927	N92-28695
NIVR-01904-N	p 923	N92-28635
NIVR-03601-N	p 924 p 827	N92-29604 N92-28658
NR PROJ. RM3-3-T-21	p 907	N92-28253
NSCRC-80-0401-E006-41	p 794	A92-45499
NSF DMC-86-57917	p 900 p 899	A92-47267 A92-46916
NSF MSM-88-12779	p 913	N92-30111
NSG-3555	p 883	A92-48908
N00014-85-C-0214	p 826	A92-48909 A92-46778
N00014-85-C-0214 N00014-85-K-0011	p 810 p 898	A92-46778
N00014-86-K-0754	p 898	A92-45826
N00014-88-C-0677	p 904	A92-48896
N00014-89-J-1276 N00014-89-J-3102	p 854 p 799	N92-29511 A92-45535
N00014-90-J-1420	p 898	A92-46252
	p 896	N92-29408
N00014-92-J-1406 N00019-84-C-0240	p 825 p 806	A92-48857 A92-45578
	p 895	N92-28426
N00019-91-C-0083	p 794	A92-45497
	p 786 p 915	A92-49049 N92-28689
OV/RLD-987	p 852	N92-28649
RNLAF-RB-KLU-1990/A.5		N92-28653
RTOP 505-59-00	•	N92-29625
RTOP 505-59-36	p 853	N92-28926
RTOP 505-59-52	D 921	N92-28909

RTOP 505-59-52 p 927 N92-28909

RTOP 505-59-85-01 CONTRACT NUMBER INDEX

RTOP 505-59-85-01	p 888	N92-29352
RTOP 505-61-51	p 878	N92-28457
RTOP 505-62-40-04	p 895	N92-28374
RTOP 505-62-40	p 824	A92-48740
RTOP 505-62-50	p 909	N92-29105
RTOP 505-62-52	p 830	N92-28980
	p 833	N92-30182
RTOP 505-62-84	p 887	N92-28673
RTOP 505-63-36	p 905	A92-48938
	p 908	N92-28434
	p 910	N92-29136
RTOP 505-63-50-06	p 850	N92-28435
RTOP 505-63-50-12	p 831	N92-29445
RTOP 505-64-30	p 878	N92-28584
	p 853	N92-29110
RTOP 505-64-36	p 841	N92-29103
RTOP 505-68-10	p 828	N92-28674
	p 828	N92-28696
RTOP 505-68-30	p 871	N92-29425
RTOP 505-68-31	p 856	A92-46792
RTOP 505-68-32	p 868	N92-28418
	p 871	N92-29661
RTOP 505-69-14	p 871	N92-29427
RTOP 505-69-50	p 854	N92-29417
	p 924	N92-30207
RTOP 505-90-52-01	p 816	A92-47042
RTOP 506-43-31	p 852	N92-28721
	p 890	N92-29104
RTOP 506-51-31	p 853	N92-28910
RTOP 509-10-02-03	p 827	N92-28477
RTOP 533-02-36	p 871	N92-29659
RTOP 535-05-10	p 831	N92-29402
RTOP 537-02-20	p 890	N92-29343
RTOP 537-02-23	p 868	N92-28419
RTOP 537-03-21-03	p 927	N92-28556
RTOP 538-02-10-01	p 912	N92-30106
RTOP 906-11-03	p 870	N92-28985
STPA-85-95-009	p 830	N92-29206
W-7405-ENG-82	p 914	N92-30119
W2207-7-AF69/01-SS	p 886	N92-28550

p 806 A92-45584 * # ... p 807 A92-45585 A92-45530

A92-45531

A92-45532

A92-45588 A92-45535

A92-45537 A92-45538

A92-45539

A92-45589 A92-45540

A92-45590

A92-45541

A92-45542

A92-45543

A92-45544

A92-45545

A92-45546

A92-45548

A92-45549

A92-45550 A92-45592

A92-45552

A92-45593

A92-45554 A92-45555

A92-45557

A92-45558 A92-45559

A92-45595 A92-45560

A92-45561 *

A92-45596

A92-45562

A92-45597

A92-45563

A92-45598

A92-45564 A92-45565

A92-45566

A92-45567

A92-45489 A92-45515

A92-47835

A92-47839

A92-47856 A92-47858

A92-47860 A92-47872 *

A92-47873

A92-47875

A92-47876 A92-47892

A92-47913 A92-47915

A92-47917 A92-46985 *

A92-46986

A92-46996

A92-47028

A92-48701

A92-48702

A92-48703 A92-48704

A92-48705

A92-48712 A92-48713

A92-48714

A92-48720

N92-29402

A92-48722 A92-48723 * #

A92-48724

p 823 A92-48730 * #

A92-48729 * #

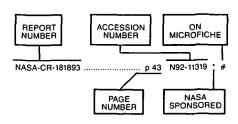
A92-47894 *

p 823

AIAA PAPER 92-3082

AIAA PAPER 92-3083

Typical Report Number Index Listing



Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

p 878 N92-28457 * #

A-89130

A-91237	A-91237	A-89130				Р	878	N92-28457	•	#
A-92014	A-92014	A-91178				р	853	N92-28926	٠	#
A-92014	A-92014	A-91237				р	890	N92-29104	٠	#
A-92021	A-92021					•		N92-28910	•	#
A-92052	A-92052							_		
A-92064	A-92064 p.852 N92-28721 # A-92072 p.831 N92-29625 # A-92081 p.854 N92-29417 # AD-2245922 p.883 N92-29407 # AD-A245940 p.829 N92-2883 # AD-A245970 p.910 N92-29344 # AD-A245973 p.879 N92-28801 # AD-A245977 p.853 N92-28823 # AD-A246618 p.907 N92-28253 # AD-A246619 p.830 N92-28253 # AD-A246622 p.926 N92-28253 # AD-A246619 p.831 N92-28253 # AD-A247661 p.831 N92-282838 # AD-A247661 p.831 N92-29539 # AD-A247191 p.831 N92-29539 # AD-A247464 p.895 N92-28388 # AD-A247464 p.895 N92-28398 # AD-A247668 p.895 N92-28865					•				
A-92072	A-92072 p 831 N92-29625 * # A-92081 p 854 N92-29417 * # AD-A245922 p 883 N92-28407 # AD-A245940 p 829 N92-28883 # AD-A245970 p 910 N92-298801 # AD-A245973 p 879 N92-28801 # AD-A245977 p 853 N92-28802 # AD-A246618 p 907 N92-28253 # AD-A2466759 p 786 N92-28248 # AD-A246759 p 786 N92-28248 # AD-A247196 p 830 N92-28888 # AD-A247196 p 830 N92-28888 # AD-A247196 p 830 N92-28888 # AD-A247464 p 895 N92-28252 # AD-A247484 p 923 N92-28686 # AD-A247489 p 883 N92-28245 # AD-A247668 p 895 N92-28245 # AD-A247668 p 895 N92-28245 # AD-A247668 p 895 N92-28812 # AD-A248033 p 926 N92-28408 # AD-A248030 p 896 N92-29408 # AD-A248010 p 895 N92-28322 # AD-A248010 p 895 N92-28322 # AD-A248010 p 896 N92-29408 # AD-A248000 p 896 N92-29408 # AD-A249000 p 896 N92-29408 # AD-A250040 p 896									
AD-A245922	A-92081									
AD-A245922	AD-A245922									
AD-A245940	AD-A245940	A-92001	.,		***************************************	μ	054	1402-20417		π
AD-A245940	AD-A245940	AD-42450	222			_	883	N92-28407		#
AD-A245970	AD-A245970									
AD-A245973	AD-A245973									
AD-A245977	AD-A246618 p 907 N92-28253 # AD-A246618 p 907 N92-28253 # AD-A246759 p 786 N92-282348 # AD-A246759 p 786 N92-282348 # AD-A246759 p 926 N92-28292 # AD-A247191 p 831 N92-29539 # AD-A247196 p 830 N92-28828 # AD-A247196 p 830 N92-28828 # AD-A247464 p 895 N92-28398 # AD-A247484 p 895 N92-28398 # AD-A247484 p 895 N92-28425 # AD-A247668 p 895 N92-28248 # AD-A247668 p 895 N92-28465 # AD-A247668 p 895 N92-28248 # AD-A247668 p 895 N92-28302 # AD-A248033 p 926 N92-29408 # AD-A248030 p 896 N92-29408 # AD-A248020 p 893 N92-28248 # AD-A248207 p 859 N92-2931 # AD-A248207 p 859 N92-2931 # AD-A248372 p 895 N92-29322 # AD-A248372 p 895 N92-29322 # AD-A248568 p 911 N92-2933 # AD-A248519 p 888 N92-29511 # AD-A248558 p 896 N92-29511 # AD-A248558 p 896 N92-29510 # AD-A249259 p 869 N92-29511 # AD-A249259 p 869 N92-29511 # AD-A249264 p 909 N92-29511 # AD-A250340 p 854 N92-29511 # AD-A250340 p 854 N92-29511 # AD-A250340 p 854 N92-29511 # AD-A250341 p 853 N92-28771 # AD-A250341 p 853 N92-28771 # AD-A250341 p 853 N92-28771 # AD-A250341 p 853 N92-29182 # AD-A250307 p 868 N92-29080 # AD-A250307 p 868 N92-29080 # AD-A250307 p 868 N92-29082 # AD-A250307 p 868 N92-29085 # AD-A250307 p 766 N92-29095 # AD-A250307 p 766 N92-29095 # AD-D015273 p 997 N92-29095 #									
AD-A246618	AD-A246618									
AD-A246759	AD-A246759									
AD-A246822	AD-A246822									
AD-A247191	AD-A247191									
AD-A247196	AD-A247196									
AD-A247430	AD-A247430									
AD-A247464	AD-A247464 p. 895 N92-28398 # AD-A247484 p. 923 N92-28245 # AD-A247489 p. 883 N92-28248 # AD-A247489 p. 883 N92-28248 # AD-A247532 p. 829 N92-28865 # AD-A247686 p. 895 N92-28912 # AD-A248033 p. 926 N92-29408 # AD-A248003 p. 986 N92-29408 # AD-A248205 p. 923 N92-29188 # AD-A248207 p. 859 N92-29222 # AD-A248207 p. 859 N92-29222 # AD-A248207 p. 859 N92-29222 # AD-A24836 p. 911 N92-29911 # AD-A248519 p. 888 N92-29505 # AD-A24856 p. 910 N92-29111 # AD-A24856 p. 910 N92-29111 # AD-A24856 p. 986 N92-28388 # AD-A24856 p. 986 N92-28388 # AD-A24856 p. 986 N92-29501 # AD-A24856 p. 986 N92-29501 # AD-A24856 p. 986 N92-29511 # AD-A24856 p. 986 N92-28388 # AD-A24959 p. 886 N92-28388 # AD-A24959 p. 886 N92-28394 # AD-A25031 p. 895 N92-28921 # AD-A250341 p. 853 N92-28911 # AD-A250341 p. 853 N92-28771 # AD-A250341 p. 853 N92-28771 # AD-A250412 p. 963 N92-29180 # AD-A250412 p. 963 N92-29180 # AD-A250412 p. 963 N92-29182 # AD-A250412 p. 963 N92-29182 # AD-A250412 p. 9637 N92-29182 # AD-A250307 p. 786 N92-28923 # AD-A250307 p. 786 N92-28023 # AD-A250307 p. 786 N92-28025 # AD-A250307 p. 786									
AD-A247484	AD-A247484 p 923 N92-28245 # AD-A247484 p 883 N92-28655 # AD-A247532 p 829 N92-28655 # AD-A247668 p 895 N92-28655 # AD-A247668 p 895 N92-288912 # AD-A248033 p 926 N92-280302 # AD-A248090 p 896 N92-29408 # AD-A248202 p 923 N92-29188 # AD-A248205 p 910 N92-29191 # AD-A248207 p 859 N92-29222 # AD-A248372 p 895 N92-282426 # AD-A248548 p 911 N92-29933 # AD-A248549 p 888 N92-29505 # AD-A248549 p 889 N92-29505 # AD-A248558 p 896 N92-29506 # AD-A248564 p 910 N92-29111 # AD-A248558 p 896 N92-29560 # AD-A248564 p 910 N92-29111 # AD-A248564 p 883 N92-28388 # AD-A248564 p 863 N92-28388 # AD-A248564 p 960 N92-29580 # AD-A250364 p 960 N92-29109 # AD-A250304 p 868 N92-28921 # AD-A250341 p 853 N92-28771 # AD-A250390 p 868 N92-29709 # AD-A250341 p 853 N92-29709 # AD-A250341 p 853 N92-29718 # AD-A250341 p 853 N92-29719 # AD-A250307 p 766 N92-29095 # AD-A250307 p 766 N92-29095 # AD-A250307 p									
AD-A247489	AD-A247689									
AD-A247532	AD-A247532		-							
AD-A247668	AD-A247668 p. 895 N92-28912 # AD-A248033 p. 926 N92-28302 # AD-A248190 p. 896 N92-29408 # AD-A248190 p. 896 N92-29408 # AD-A248202 p. 923 N92-29188 # AD-A248205 p. 910 N92-29191 # AD-A248207 p. 859 N92-292191 # AD-A248372 p. 895 N92-28426 # AD-A248548 p. 911 N92-29933 # AD-A248549 p. 888 N92-29505 # AD-A248543 p. 888 N92-29505 # AD-A248548 p. 896 N92-29506 # AD-A248549 p. 898 N92-29511 # AD-A248549 p. 898 N92-29580 # AD-A248549 p. 898 N92-29580 # AD-A248549 p. 898 N92-29580 # AD-A250188 p. 896 N92-28388 # AD-A250407 p. 888 N92-28771 # AD-A250390 p. 888 N92-29709 # AD-A250407 p. 887 N92-28772 # AD-A250412 p. 837 N92-29180 # AD-A250412 p. 837 N92-29182 # AD-A250307 p. 868 N92-28722 # AD-A250307 p. 867 N92-28772 # AD-A250307 p. 867 N92-28923 # AD-A250307 p. 8792-28923 # AD-A250307 p. 887 N92-28920 # AD-A250307 p. 887 N92-28920 # AD-A250307 p. 887 N92-28900 # AD-A250307 p. 888 N92-28922 #									
AD-A248033	AD-A248033									
AD-A248190	AD-A248190									
AD-A248202 p 923 N92-29188 AD-A248207 p 850 N92-29222 AD-A248207 p 850 N92-29222 AD-A248207 p 859 N92-29222 AD-A248372 p 855 N92-28222 AD-A248458 p 911 N92-29933 AD-A248519 p 888 N92-29505 AD-A248543 p 854 N92-29511 AD-A248568 p 896 N92-29580 AD-A248561 p 883 N92-29580 AD-A248561 p 883 N92-28388 AD-A249259 p 868 N92-28388 AD-A249259 p 868 N92-28389 AD-A250188 p 895 N92-28921 AD-A250188 p 895 N92-28921 AD-A250341 p 853 N92-28771 AD-A250340 p 854 N92-29709 AD-A250407 p 867 N92-29180 AD-A250341 p 853 N92-28777 AD-A250451 p 937 N92-29180 AD-A250407 p 867 N92-29180 AD-A250407 p 867 N92-29180 AD-A250407 p 867 N92-29180 AD-A250301 p 987 N92-29180 AD-A250301 p 987 N92-29100 AD-A250307 p 786 N92-29522 AD-A253007 p 786 N92-28923 AD-A253007 p 786 N92-29095 AD-D015273 p 9927 N92-29095 AD-D01	AD-A248202 p 923 N92-29188 # AD-A248205 p 910 N92-29191 # AD-A248207 p 859 N92-29222 # AD-A248207 p 859 N92-29222 # AD-A248372 p 859 N92-28426 # AD-A248458 p 911 N92-29933 # AD-A248543 p 888 N92-29505 # AD-A248543 p 854 N92-29511 # AD-A248548 p 896 N92-29560 # AD-A248558 p 896 N92-29580 # AD-A248558 p 896 N92-29580 # AD-A248558 p 896 N92-28580 # AD-A248259 p 868 N92-28294 # AD-A250188 p 895 N92-28879 # AD-A250188 p 895 N92-28821 # AD-A250221 p 909 N92-29118 # AD-A25021 p 868 N92-29709 # AD-A250341 p 853 N92-28771 # AD-A250390 p 854 N92-29709 # AD-A250407 p 867 N92-29180 # AD-A250412 p 837 N92-29182 # AD-A250412 p 837 N92-29182 # AD-A250412 p 837 N92-29182 # AD-A250307 p 786 N92-29182 # AD-A250307 p 786 N92-28772 # AD-A250307 p 786 N92-28090 # AD-A250307 p 786 N92-28090 # AD-A250307 p 786 N92-28090 # AD-A253007 p 786 N92-28090 # AD-A253007 p 786 N92-28095 #									
AD-A248205	AD-A248205									#
AD-A248372	AD-A248372							N92-29191		
AD-A248372	AD-A248372									
AD-A248458	AD-A248458							N92-28426		
AD-A248519	AD-A248519							N92-29933		
AD-A248558	AD-A248558	AD-A2485	19			p	888	N92-29505		#
AD-A248558	AD-A248558	AD-A2485	43			Þ	854	N92-29511		#
AD-A249259	AD-A249259	AD-A2485	558			p	896	N92-29580		#
AD-A249284	AD-A249284 p 909 N92-28879 # AD-A250188 p 895 N92-28821 # AD-A250221 p 909 N92-2918 # AD-A250293 p 888 N92-29709 # AD-A250341 p 853 N92-28771 # AD-A250390 p 854 N92-29180 # AD-A250407 p 867 N92-28772 # AD-A250412 p 837 N92-29182 # AD-A250561 p 927 N92-28923 # AD-A253007 p 786 N92-28522 # AD-D015273 p 927 N92-29095 #	AD-A2485	81			p	883	N92-28388		#
AD-A250188	AD-A250188	AD-A2492	259		****************	p	868	N92-28294		#
AD-A250221 p 909 N92-29118 ft AD-A250293 p 888 N92-29709 ft AD-A250391 p 853 N92-28771 ft AD-A250390 p 854 N92-29180 ft AD-A250407 p 867 N92-29180 ft AD-A250412 p 837 N92-29182 ft AD-A250561 p 927 N92-28923 ft AD-A2502734 p 837 N92-28900 ft AD-A253007 p 786 N92-28522 ft AD-A253007 p 786 N92-28095 ft AD-D015273 p 927 N92-29095 ft AD-D015273	AD-A250221	AD-A2492	284					N92-28879		#
AD-A250293 p 888 N92-29709 f AD-A250341 p 853 N92-28771 AD-A250340 p 854 N92-29180 f AD-A250407 p 887 N92-28180 f AD-A250412 p 837 N92-29182 f AD-A250451 p 927 N92-29923 f AD-A250561 p 937 N92-28923 f AD-A250561 p 937 N92-28900 f AD-A253007 p 786 N92-28522 f AD-D015273 p 927 N92-29095 f	AD-A250293	AD-A2501	88			p	895	N92-28921		#
AD-A250341	AD-A250341	AD-A2502	21			p	909	N92-29118		#
AD-A250390	AD-A250390	AD-A2502	293			p	888	N92-29709		#
AD-A250407	AD-A250407	AD-A2503	141			p	853	N92-28771		#
AD-A250412 p 837 N92-29182 f AD-A250561 p 927 N92-28923 f AD-A252734 p 837 N92-28900 f AD-A253007 p 786 N92-28522 f AD-D015273 p 927 N92-29095 f	AD-A250412	AD-A2503	390			p	854	N92-29180		#
AD-A250561	AD-A250561	AD-A2504	107			p	887	N92-28772		#
AD-A252734	AD-A252734	AD-A2504	112			p	837	N92-29182		#
AD-A253007 p 786 N92-28522 A AD-D015273 p 927 N92-29095 A	AD-A253007 p 786 N92-28522 # AD-D015273 p 927 N92-29095 #	AD-A2505	61			p	927	N92-28923		#
AD-D015273 p 927 N92-29095 #	AD-D015273 p 927 N92-29095 #	AD-A2527	734			p	837	N92-28900		#
AD-D015273 p 927 N92-29095 #	AD-D015273 p 927 N92-29095 #	AD-A2530	007			p	786	N92-28522		#
	, "	4D D0454				_	007	NIDO GOGOS		ш
AERO-REPT-8907 p 910 N92-29683 #	AERO-REPT-8907 p 910 N92-29683 #	AU-D0152	273		***************************************	Р	927	N92-29095		#
		AERO-RE	PT-8	3907		р	910	N92-29683		#

AFIT/GCS/ENG/92M-03 p 859 N92-29222 #

AFIT/GLM/LSQ/91S-57	786	N92-28348 :	#	ΔΙΔΔ Ε	APFR 92-26	376		n 806
THE THE COURT OF T	, , ,	1402-20040	,,				***************************************	
AFIT/GOR/ENS/92M-11	910	NG2-29191 :	#					
TO TO CONTENT OF THE STATE OF T	5 5 10	1432-23131 /	7					
AFOSR-92-0077TR	830	NG2-28888	#				***************************************	
AFOSR-92-0222TR			#	AIAA F	PAPER 92-26	80	***************************************	p 799
AFOSR-92-0238TR			#	AIAA F	PAPER 92-26	85		p 799
AFOSR-92-0259TR			#		PAPER 92-26		***************************************	
AFOSR-92-0365TR			#	AIAA F	PAPER 92-26	88		p 799
70 001102-0005111	3 303	1432-23110 7	T .	AIAA F	PAPER 92-26	89	***************************************	p 799
AGARD-AG-329	859	N92-28376	#	AIAA F	PAPER 92-26	90	***************************************	p 800
	000	1132 20010 7	,	AIAA F	PAPER 92-26	391		p 800
AGARD-AR-312	850	N92-28468	#	AIAA F	PAPER 92-26	92		p 800
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	•					
AGARD-CP-513	786	N92-28522 #	#					
		1402 20022	,	AIAA F	PAPER 92-26	96		p 807
AGARD-LS-183	868	N92-28458	#					
AGARD-LS-186			#					
•			•					
AGARD-PAPER-2 p	851	N92-28473 * #	#				•••••	
				AIAA F	APER 92-27	03		p 801
AIAA PAPER 91-5031	832	N92-29713 #	#	AIAA F	PAPER 92-27	04		p 801
AIAA PAPER 91-5041			#					
AIAA PAPER 92-2600			#	AIAA P	APEH 92-27	07		p 801
AIAA PAPER 92-2601			#					
AIAA PAPER 92-2602 p	792	A92-45479 * #	#					
AIAA PAPER 92-2603 p		A92-45480 * #	#	AIAA P	APER 92-27	10		p 802
AIAA PAPER 92-2605	792	A92-45482 * #	#	AIAA P	APER 92-27	11		p 802
AIAA PAPER 92-2606 p	805		#	AIAA F	APER 92-27	12	***************************************	p 807
AIAA PAPER 92-2608 p	805	A92-45568 * #	#	AIAA P	MPER 92-27	14	••••••	p 802
AIAA PAPER 92-2609 p		A92-45483 #	#				••••••	
AIAA PAPER 92-2610 p			#					
AIAA PAPER 92-2611 p		A92-45485 * #	#	AIAA P	APER 92-27	17		p 803
AIAA PAPER 92-2613 p			#				***************************************	
AIAA PAPER 92-2614 p			r					
AIAA PAPER 92-2615 p			#	AIAA D	APER 32-27	21		p 803
AIAA PAPER 92-2616 p			#				***************************************	
AIAA PAPER 92-2617 p	805	A92-45572 #						
AIAA PAPER 92-2618 p			#	MAAA	APER 02.27	25		P 003
AIAA PAPER 92-2619 p			#				***************************************	
AIAA PAPER 92-2620p		A92-45573 #	T	AIAA P	APER 92.27	27		p 808
AIAA PAPER 92-2621 p		A92-45493 * #		AIAA P	APER 92-27	28		n 804
AIAA PAPER 92-2622-CP p		N92-30182 * #	T	AIAA P	APER 92-27	29	***************************************	D 808
AIAA PAPER 92-2622 p	793	A92-45494 * #	7				***************************************	
AIAA PAPER 92-2623p		A92-45495 #	r	AIAA P	APER 92-27	31		p 804
AIAA PAPER 92-2624p		A92-45496 #	r				***************************************	
AIAA PAPER 92-2625p		A92-45497 # A92-45498 #	7					
AIAA PAPER 92-2626 p AIAA PAPER 92-2627 p			,	AIAA P	APER 92-27	34		p 917
AIAA PAPER 92-2628p		A92-45499 # A92-45500 #	r					
AIAA PAPER 92-2629		A92-45501 #		AIAA P	APER 92-28	52	***************************************	p 892
AIAA PAPER 92-2630		A92-45502 * #	7	AIAA P	APER 92-28	56		p 819
AIAA PAPER 92-2631		A92-45503 #	4					
AIAA PAPER 92-2632p		A92-45504 #		AIAA P	APER 92-28	74		p 819
AIAA PAPER 92-2633		A92-45505 * #	·	AIAA P	APER 92-28	76		p 820
AIAA PAPER 92-2634p		A92-45574 * #	4					
AIAA PAPER 92-2635		A92-45506 #	4	AIAA P	APER 92-28	96		p 820
AIAA PAPER 92-2636p		A92-45575 * #	4					- 000
AIAA PAPER 92-2637 p					APER 92-28			
	906	A92-45576 * #	4 .	AIAA P	APER 92-28	99		p 820
AIAA PAPER 92-2638p			# #	AIAA P AIAA P	APER 92-28 APER 92-29	99 00		p 820 p 820
AIAA PAPER 92-2638 p AIAA PAPER 92-2639 p	796 796	A92-45576 * #	# # #	AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29	99 00 20		p 820 p 820 p 821
AIAA PAPER 92-2638 p	796 796	A92-45576 * # A92-45507 #	# · · # #	AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29	99 00 20 22		p 820 p 820 p 821 p 821
AIAA PAPER 92-2638 p AIAA PAPER 92-2639 p	796 796 796	A92-45576 * # A92-45507 # A92-45508 * #	# # # #	AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29	99 00 20 22 49		p 820 p 820 p 821 p 821 p 901
AIAA PAPER 92-2638	796 796 796 796	A92-45576 * # A92-45507 # A92-45508 * # A92-45509 #	# # # #	AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29	99 00 20 22 49		p 820 p 820 p 821 p 821 p 901 p 821
AIAA PAPER 92-2638	796 796 796 796 796	A92-45576 * # A92-45507 # A92-45508 * # A92-45509 # A92-45510 * #	; ; ; ; ;	AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29	99 00 20 22 49 51		p 820 p 820 p 821 p 821 p 901 p 821 p 821
AIAA PAPER 92-2638	796 796 796 796 796 796	A92-45576 * # A92-45507 # A92-45508 * # A92-45509 # A92-45510 * # A92-45513 #	; ; ; ; ; ;	AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29	99 00 20 22 49 51 53 70		p 820 p 820 p 821 p 821 p 901 p 821 p 821 p 816
AIAA PAPER 92-2638	796 796 796 796 796 796 796 797	A92-45576 * # A92-45507 # A92-45508 * # A92-45509 # A92-45510 * # A92-45513 # A92-45514 #	; ; ; ; ; ; ;	AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29	99 00 20 22 49 51 53 70		p 820 p 820 p 821 p 821 p 901 p 821 p 821 p 816 p 816
AIAA PAPER 92-2638	796 796 796 796 796 796 796 797	A92-45576 * # A92-45507 # A92-45509 # A92-45509 # A92-45510 * # A92-45513 # A92-45516 # A92-45516 * # A92-45518 * #	# # # # # # #	AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29	99 00 20 22 49 51 53 70 71 86		p 820 p 820 p 821 p 821 p 901 p 821 p 821 p 816 p 816 p 899
AIAA PAPER 92-2638 PAIAA PAPER 92-2639 PAIAA PAPER 92-2642 PAIAA PAPER 92-2643 PAIAA PAPER 92-2646 PAIAA PAPER 92-2647 PAIAA PAPER 92-2649 PAIAA PAPER 92-2650 PAIAA PAPER 92-2651 PAIAA PAPER 92-2651 PAIAA PAPER 92-2653 PAIAA P	796 796 796 796 796 796 797 797 797 805	A92-45576 * # A92-45507 # A92-45509 * # A92-45510 * # A92-45513 # A92-45514 # A92-45516 # A92-45517 * # A92-45518 * # A92-45518 * # A92-45569 #	# # # # # # # # # # #	AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30	99 00 20 22 49 51 53 70 71 86 27		p 820 p 820 p 821 p 821 p 901 p 821 p 821 p 816 p 816 p 899 p 925
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7796 7797 7797	A92-45576 * # A92-45508 * # A92-45508 * # A92-45509 * # A92-45510 * # A92-45514 * # A92-45516 * # A92-45517 * # A92-45518 * # A92-45569 * # A92-45578 * #	# # # # # # # # # # # # # # # # # # #	AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27		p 820 p 820 p 821 p 821 p 901 p 621 p 821 p 816 p 816 p 899 p 925 p 822
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45509 # A92-45510 * # A92-45513 # A92-45516 # A92-45516 # A92-45516 * # A92-45518 * # A92-45519 # A92-45519 # A92-45519 #	# # # # # # # # # # # # # # # # # # #	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 40 41		P 820 P 820 P 821 P 821 P 901 P 821 P 821 P 816 P 816 P 899 P 925 P 822 P 822
AIAA PAPER 92-2638 PAIAA PAPER 92-2639 PAIAA PAPER 92-2642 PAIAA PAPER 92-2643 PAIAA PAPER 92-2646 PAIAA PAPER 92-2647 PAIAA PAPER 92-2649 PAIAA PAPER 92-2650 PAIAA PAPER 92-2651 PAIAA PAPER 92-2653 PAIAA PAPER 92-2654 PAIAA PAPER 92-2656 PAIAA PAPER 92-2658 PAIAA PAPER 92-2658 PAIAA PAPER 92-2658 PAIAA PAPER 92-2658 PAIAA PAPER 92-2659 PAIAA PAPER 92-2659 PAIAA PAPER 92-2659	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45510 * # A92-45511 * # A92-45514 # A92-45516 # A92-45518 * # A92-45518 * # A92-45518 * # A92-45569 # A92-45578 # A92-45579 # A92-45509 # A92-45500 #	;	AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 40 41		P 820 P 820 P 821 P 821 P 901 P 821 P 821 P 816 P 816 P 899 P 925 P 822 P 822 P 822
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45510 * # A92-45514 # A92-45514 # A92-45516 # A92-45516 # A92-45517 * # A92-45580 # A92-45580 # A92-45580 #	*	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 40 41 42 44		P 820 P 820 P 821 P 821 P 901 P 821 P 821 P 816 P 899 P 925 P 822 P 822 P 822
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45509 * # A92-45510 * # A92-45514 # A92-45514 # A92-45516 * # A92-45517 * # A92-45518 * # A92-45519 # A92-4559 #	**	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 40 41 42 44 45		P 820 P 820 P 821 P 821 P 901 P 821 P 821 P 816 P 899 P 925 P 822 P 822 P 822 P 822
AIAA PAPER 92-2638 PAIAA PAPER 92-2639 PAIAA PAPER 92-2642 PAIAA PAPER 92-2642 PAIAA PAPER 92-2643 PAIAA PAPER 92-2647 PAIAA PAPER 92-2647 PAIAA PAPER 92-2650 PAIAA PAPER 92-2651 PAIAA PAPER 92-2653 PAIAA PAPER 92-2658 PAIAA PAPER 92-2658 PAIAA PAPER 92-2659 PAIAA PAPER 92-2669 PAIAA PAPER 92-2661 PAIAA PAPER 92-2661 PAIAA PAPER 92-2661 PAIAA PAPER 92-2660 PAIAA PAPER 92-2660 PAIAA PAPER 92-2660 PAIAA PAPER 92-2666 PAIAA P	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45509 # A92-45510 * # A92-45514 # A92-45516 # A92-45518 * # A92-45518 * # A92-45569 # A92-45580	***	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 40 41 42 44 45 54		P 820 P 820 P 821 P 821 P 821 P 821 P 821 P 816 P 816 P 899 P 925 P 822 P 822 P 822 P 822 P 822 P 822
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45510 * # A92-45514 # A92-45514 # A92-45516 # A92-45516 # A92-45516 # A92-45569 # A92-45580 #	* * * * * * * * * * * * * * * * * * * *	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30	99 00 20 22 49 51 53 70 71 86 27 44 44 45 45 55		P 820 P 820 P 821 P 821 P 821 P 821 P 821 P 821 P 821 P 846 P 925 P 822 P 822
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45509 # A92-45509 # A92-45509 # A92-45510 * # A92-45514 # A92-45514 # A92-45516 * # A92-45517 * # A92-45519 # A92-4559 # A92-45520 # A92-45520 # A92-45521 # A92-45521 # A92-45521 # A92-45521 # A92-45521 # A92-45522 # A92-45522 # A92-45522 # A92-45523 #	* * * * * * * * * * * * * * * * * * * *	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30	99 00 20 22 49 51 53 77 18 67 74 44 44 45 55 56		P 820 P 820 P 821 P 821 P 901 P 821 P 816 P 816 P 825 P 822 P 822 P 822 P 822 P 822 P 822 P 822 P 822 P 823 P 823 P 833 P 893
AIAA PAPER 92-2638	7796 7796 7796 7796 7797 7797 7797 7797	A92-45576 * # A92-45508 # A92-45509 # A92-45510 * # A92-45511 * # A92-45514 # A92-45516 # A92-45518 * # A92-45518 * # A92-45519 # A92-45520 # A92-4552	* * * * * * * * * * * * * * * * * * * *	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30	99 00 22 49 51 53 70 71 86 72 40 44 44 44 45 46 56 66		P 820 P 820 P 821 P 901 P 821 P 821 P 821 P 816 P 816 P 822 P 822 P 822 P 822 P 822 P 822 P 822 P 823 P 823
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45507 # A92-45509 # A92-45510 * # A92-45511 * # A92-45514 # A92-45516 # A92-45518 * # A92-45569 # A92-45569 # A92-45569 # A92-45569 # A92-45569 # A92-45560 # A92-4560 # A92	****	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30	99 00 22 49 51 53 70 71 86 77 44 44 45 55 66 69		P 820 P 820 P 821 P 901 P 821 P 821 P 821 P 816 P 816 P 822 P 822 P 822 P 822 P 822 P 822 P 822 P 823 P 823 P 833 P 831
AIAA PAPER 92-2638	7796 7796 7796 7796 7796 7797 7797 7797	A92-45576 * # A92-45508 # A92-45509 # A92-45510 * # A92-45511 * # A92-45514 # A92-45516 # A92-45518 * # A92-45518 * # A92-45519 # A92-45520 # A92-4552	****	AIAA P AIAA P	APER 92-28 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-29 APER 92-30 APER 92-30	99 00 22 49 51 57 77 86 77 40 41 44 45 45 55 66 69 71 73		P 820 P 820 P 821 P 821 P 821 P 821 P 821 P 816 P 816 P 899 P 922 P 822 P 822 P 822 P 822 P 822 P 822 P 823 P 833 P 831 P 893

AIAA PAPER 92-2674 p 806 A92-45583 *

AIAA PAPER 92-2675 p 798 A92-45529 #

AIAA PAPER 92-3089	р 903	A92-48734 * #	AIAA PAPER 92-3745	. p 866	A92-49110 * #	ETN-92-91450			#
AIAA PAPER 92-3090			AIAA PAPER 92-3747	. р 866	A92-49111 * #	ETN-92-91453	p 924	N92-29604	#
AIAA PAPER 92-3092	n 871	N92-29425 * #	AIAA PAPER 92-3754			ETN-92-91454	p 841	N92-29605	#
AIAA PAPER 92-3094			AIAA PAPER 92-3755			ETN-92-91491			#
AIAA PAPER 92-3095						ETN-92-91492			#
			AIAA PAPER 92-3757			ETN-92-91493			#
AIAA PAPER 92-3097			AIAA PAPER 92-3760						#
AIAA PAPER 92-3098			AIAA PAPER 92-3762			ETN-92-91495		N92-29680	
AIAA PAPER 92-3099			AIAA PAPER 92-3773			ETN-92-91496		N92-29629	#
AIAA PAPER 92-3100	p 824	A92-48742 #	AIAA PAPER 92-3775	. р867	A92-49119 #	ETN-92-91497		N92-29648	#
AIAA PAPER 92-3101	р 863	A92-48743 * #	AIAA PAPER 92-3776	. p 867	A92-49120 #	ETN-92-91498	p 832	N92-29713	#
AIAA PAPER 92-3102	p 824	A92-48744 * #	AIAA PAPER 92-3790	. p 868	N92-28418 * #	ETN-92-91499	p 831	N92-29649	#
AIAA PAPER 92-3154			AIAA PAPER 92-3794			ETN-92-91500	p 854	N92-29650	#
AIAA PAPER 92-3169	n 863	A92-48790 #	AIAA PAPER 92-3809			ETN-92-91512		N92-28658	#
						ETN-92-91513		N92-29615	#
AIAA PAPER 92-3176			AIAA PAPER 92-3841			ETN-92-91514		N92-29616	#
AIAA PAPER 92-3178			AIAA PAPER 92-3846						
AIAA PAPER 92-3179		A92-48794 #	AIAA PAPER 92-3869			ETN-92-91518		N92-28659	#
AIAA PAPER 92-3188		A92-48800 #	AIAA PAPER 92-3916	. р887	N92-28673 * #	ETN-92-91519		N92-28660	#
AIAA PAPER 92-3189	p 863	A92-48801 #				ETN-92-91520		N92-28669	#
AIAA PAPER 92-3190	p 923	A92-48802 #	AL-TP-1992-0009	. p 888	N92-29505 #	ETN-92-91523		N92-28689	#
AIAA PAPER 92-3192	р 903	A92-48803 #				ETN-92-91530	p 828	N92-28709	#
AIAA PAPER 92-3193		A92-48804 #	AL-TR-1991-0085-VOL-2	n 923	N92-29188 #	ETN-92-91531	p 870	N92-28711	#
AIAA PAPER 92-3194		A92-48805 #	,,_ ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			ETN-92-91533	p 908	N92-28712	#
AIAA PAPER 92-3212		A92-48817 #	ARI-RN-92-32	0.888	N92-29709 #	ETN-92-91535		N92-28692	#
			Ani-niv-32-32	. р ооо	1432-23103 #	ETN-92-91536		N92-28661	#
AIAA PAPER 92-3231					NO. 00774 #	ETN-92-91537		N92-29204	#
AIAA PAPER 92-3244		A92-48844 * #	ARL-STRUC-TM-544	. p 853	N92-28771 #				
AIAA PAPER 92-3246		A92-48845 #				ETN-92-91540		N92-28694	#
AIAA PAPER 92-3247		A92-48846 #	ASME PAPER 91-GT-221	. р 899	A92-46825	ETN-92-91541		N92-28695	#
AIAA PAPER 92-3248		A92-48847 #				ETN-92-91543		N92-28713	#
AIAA PAPER 92-3249	p 894	A92-48848 #	ASTM STP-1122	. p 896	A92-45226	ETN-92-91544		N92-28714	#
AIAA PAPER 92-3251		A92-48849 * #				ETN-92-91546		N92-29916	#
AIAA PAPER 92-3259		A92-48855 #	AVSCOM-TR-91-C-036	p 908	N92-28434 * #	ETN-92-91547		N92-29884	#
AIAA PAPER 92-3260		A92-48856 #	AVSCOM-TR-91-C-043			ETN-92-91695		N92-29873	#
AIAA PAPER 92-3262		A92-48857 #	AVSCOM-TR-91-C-043			ETN-92-91696		N92-29874	#
AIAA PAPER 92-3263		A92-48858 * #				ETN-92-91697		N92-30076	#
			AVSCOM-TR-92-C-026	. р эоэ	N32-29105 #	ETN-92-91731		N92-29877	#
AIAA PAPER 92-3264		A92-48859 #							
AIAA PAPER 92-3282		A92-48872 #	CERL-N-92/07	. p 926	N92-28292 #	ETN-92-91733		N92-29997	#
AIAA PAPER 92-3287		A92-48876 * #				ETN-92-91903	p /8/	N92-30232	#
AIAA PAPER 92-3289		A92-48878 #	CONF-920432-11	. р 909	N92-28814 #				
AIAA PAPER 92-3290	р 864	A92-48879 #				FAA-APO-92-1	p 837	N92-29182	#
AIAA PAPER 92-3292	p 882	A92-48881 #	CRDEC-TR-309	p 883	N92-28248 #				
AIAA PAPER 92-3309		A92-48896 #		•		GARTEUR-TP-051	p 854	N92-29616	#
AIAA PAPER 92-3311		A92-48897 #	CUED/A-AERO/TR-18	p 927	N92-29201 #				
AIAA PAPER 92-3312		A92-48898 #	0025177721107111110			GARTEUR/TP-056	p 878	N92-28652	#
AIAA PAPER 92-3313		A92-48899 #	DE92-013233	n 909	N92-28814 #				
AIAA PAPER 92-3318		A92-48902 * #	DE92-013233	. р эоз	1132-20014 #	H-1764	n 871	N92-29659	• #
			DI D ED 00 00	- 000	NOO 00150 #	H-1769			
AIAA PAPER 92-3319		A92-48903 #	DLR-FB-90-26	. p 830	N92-29159 #	11-1700	p 0/0		
						⊔ 1775	n 071		
AIAA PAPER 92-3321		A92-48904 #	DLR-FB-91-28		N92-29997 #	H-1775			
AIAA PAPER 92-3323	p 825	A92-48906 #	DLR-FB-91-28 DLR-FB-91-34		N92-29997 #	H-1806	p 871	N92-29425	#
	p 825	A92-48906 # A92-48907 #	DLR-FB-91-34	p 859	N92-29997 # N92-29870 #		p 871	N92-29425	* #
AIAA PAPER 92-3323	p 825 p 904	A92-48906 #		p 859	N92-29997 # N92-29870 #	H-1833	p 871 p 853	N92-29425 1 N92-29110 1	- #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325	p 825 p 904 p 883	A92-48906 # A92-48907 #	DLR-FB-91-34 DLR-MITT-91-10	p 859	N92-29997 # N92-29870 # N92-29877 #	H-1806	p 871 p 853	N92-29425 1 N92-29110 1	- #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326	p 825 p 904 p 883 p 826	A92-48906 # A92-48907 # A92-48908 * # A92-48909 * #	DLR-FB-91-34 DLR-MITT-91-10	p 859	N92-29997 # N92-29870 # N92-29877 #	H-1833	p 871 p 853	N92-29425 1 N92-29110 1	- #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327	p 825 p 904 p 883 p 826 p 923	A92-48906 # A92-48907 # A92-48908 * # A92-48909 * # A92-48910 #	DLR-FB-91-34	p 859	N92-29997 # N92-29870 # N92-29877 #	H-1806 H-1833INT-PATENT-CLASS-B64C-3/14 .	p 871 p 853 p 829	N92-29425 N92-29110 N92-28729	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328	p 825 p 904 p 883 p 826 p 923	A92-48906 # A92-48907 # A92-48908 * # A92-48910 # A92-48911 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633	p 859 p 911 p 853	N92-29997 # N92-29870 # N92-29877 # N92-28771 #	H-1833	p 871 p 853 p 829	N92-29425 N92-29110 N92-28729	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332	p 825 p 904 p 883 p 826 p 923 p 865 p 850	A92-48906 # A92-48907 # A92-48908 * # A92-48910 # A92-48911 # A92-48915 #	DLR-FB-91-34 DLR-MITT-91-10	p 859 p 911 p 853	N92-29997 # N92-29870 # N92-29877 # N92-28771 #	H-1806	p 871 p 853 p 829 p 909	N92-29425 N92-29110 N92-28729 N92-29099	• # • # •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333	p 825 p 904 p 883 p 826 p 923 p 865 p 850	A92-48906 # A92-48907 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 #	DLR-FB-91-34	p 859 p 911 p 853 p 837	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 #	H-1806 H-1833INT-PATENT-CLASS-B64C-3/14 .	p 871 p 853 p 829 p 909	N92-29425 N92-29110 N92-28729 N92-29099	• # • # •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3335	p 825 p 904 p 883 p 826 p 923 p 865 p 850 p 850 p 850	A92-48906 # A92-48908 * # A92-48908 * # A92-48910 # A92-48911 # A92-48916 # A92-48916 # A92-48917 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633	p 859 p 911 p 853 p 837	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 #	H-1806	p 871 p 853 p 829 p 909 p 916	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3338	p 825 p 904 p 883 p 826 p 923 p 865 p 850 p 850 p 850 p 850	A92-48906 # A92-48907 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * N92-29343 * #	DLR-FB-91-34	p 859 p 911 p 853 p 837 p 870	N92-29977 # N92-29877 # N92-28771 # N92-28900 # N92-28686 #	H-1806	p 871 p 853 p 829 p 909 p 916	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3338 AIAA PAPER 92-3340	p 825 p 904 p 883 p 826 p 923 p 865 p 850 p 850 p 850 p 850 p 890	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48915 # A92-48916 # A92-48917 # N92-29343 * # A92-48919 * #	DLR-FB-91-34	p 859 p 911 p 853 p 837 p 870	N92-29977 # N92-29877 # N92-28771 # N92-28900 # N92-28686 #	H-1806	p 871 p 853 p 829 p 909 p 916 p 909	N92-29425 N92-29110 N92-28729 N92-29099	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346	p 825 p 904 p 883 p 826 p 923 p 865 p 850 p 850 p 850 p 890 p 894	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-29343 * # A92-48919 * # A92-48923 * #	DLR-FB-91-34	p 859 p 911 p 853 p 837 p 870 p 854	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-29180 #	H-1806	p 871 p 853 p 829 p 909 p 916 p 909 p 897	N92-29425 N92-29110 N92-28729 N92-29099 N92-29099 N92-29099 A92-45261	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3350	P 825 P 904 P 883 P 883 P 826 P 923 P 865 P 850 P 850 P 850 P 850 P 890 P 894	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48915 # A92-48916 # A92-48917 # N92-29343 * # A92-48919 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830	N92-29997 # N92-29870 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-29180 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3360 AIAA PAPER 92-3363	P 825 P 904 P 883 P 826 P 923 P 926 P 850 P 850 P 850 P 850 P 850 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48916 # A92-48916 # A92-48917 * # A92-48923 * # A92-48923 * # A92-48923 * # A92-48926 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-28980 * # N92-28980 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3350	P 825 P 904 P 883 P 826 P 923 P 926 P 850 P 850 P 850 P 850 P 850 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48916 # A92-48916 # A92-48917 * # A92-48923 * # A92-48923 * # A92-48923 * # A92-48926 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 887 . p 828	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-28980 * # N92-28673 * # N92-28669 * #	H-1806	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896	N92-29425 N92-29110 N92-28729 N92-29099 N92-29099 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3360 AIAA PAPER 92-3363	P 825 P 905 P 883 P 883 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 894 P 905 P 896	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48917 # A92-48917 # N92-29343 * # A92-48919 * # A92-48923 * # A92-48936 * # A92-48937 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 887 . p 828	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-28980 * # N92-28673 * # N92-28669 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896	N92-29425 N92-29110 N92-28729 N92-29099 N92-29099 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3364 AIAA PAPER 92-3364 AIAA PAPER 92-3365	P 825 P 904 P 883 P 826 P 923 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 894 P 905 P 905 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48917 # A92-48917 # N92-29343 * # A92-48919 * # A92-48923 * # A92-48936 * # A92-48937 * #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 8887 . p 828 . p 924	N92-29997 # N92-29870 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-28980 * # N92-28696 * # N92-30207 * #	H-1806	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896 p 901	N92-29425 N92-29110 N92-28729 N92-29099 N92-29099 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3366	P 825 P 904 P 883 P 826 P 923 P 826 P 923 P 850 P 850 P 850 P 890 P 890 P 9905 P 9905 P 9905 P 9905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48919 * # A92-48923 * # A92-48927 # A92-48927 # A92-48938 * # A92-48938 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 888 . p 924 . p 908	N92-29997 # N92-29870 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-28696 * N92-28696 * N92-28696 * N92-28694 * N92-28694 * N92-28694 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896 p 901 p 784	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45226	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3360 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366	P 825 P 904 P 883 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 850 P 890 P 890 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48915 # A92-48916 # A92-48917 * # A92-48937 * # A92-48937 * # A92-48938 * # A92-48939 * #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 828 . p 924 . p 908 . p 833	N92-29997 # N92-29870 # N92-29877 # N92-28971 # N92-28980 # N92-28686 # N92-29180 # N92-286673 * # N92-28696 * # N92-28434 * # N92-30182 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-807263-406-X ISBN 0-903409-68-2	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896 p 901 p 784 p 783	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-47403 A92-47403 A92-47403 A92-47403	• # • # •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 890 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # N92-29343 * # A92-48918 * # A92-48927 # A92-48937 * # A92-48937 * # A92-48938 # A92-48938 # A92-48940 * # A92-48941 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 828 . p 924 . p 908 . p 933 . p 871	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28686 # N92-29180 # N92-28696 * # N92-28696 * # N92-28696 * # N92-28434 * # N92-30182 * # N92-29661 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 896 p 901 p 783 p 929	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45226 A92-45302 A92-45302 A92-45302 A92-46201	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3367 AIAA PAPER 92-3368	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48919 * # A92-48927 # A92-48927 # A92-48927 * A92-48938 * # A92-48938 * # A92-48938 * # A92-48939 * # A92-48940 * # A92-48940 * # A92-48949 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 828 . p 924 . p 908 . p 833 . p 871 . p 910	N92-29997 # N92-29870 # N92-28771 # N92-28900 # N92-28686 # N92-29180 # N92-29180 * N92-28696 * N92-28696 * N92-30182 * N92-286434 * N92-30182 * N92-29661 * N92-29136 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56091-146-8	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 784 P 783 P 929 P 783	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-45265 A92-45265 A92-45265 A92-45265 A92-45265 A92-45302 A92-45302 A92-45306	• # • # •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3320 AIAA PAPER 92-3420 AIAA PAPER 92-3425	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 905 P 905 P 905 P 905 P 865 P 865 P 865	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48915 # A92-48916 # A92-48916 * A92-48919 * # A92-48927 # A92-48937 * # A92-48938 * # A92-48939 * # A92-48939 * # A92-48940 * # A92-48940 * # A92-48979 # A92-48979 #	DLR-FB-91-34	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 887 . p 824 . p 908 . p 833 . p 871 . p 910 . p 868	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28666 # N92-286673 * # N92-28666 * # N92-286434 * # N92-29136 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-55831-117-1 ISBN 1-56091-146-8 ISBN 1-56091-146-8	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 901 p 784 p 783 p 929 p 783 p 9862	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-4526 A92-47035 A92-45206 A92-47403 A92-45206 A92-47403 A92-45302 A92-46201 A92-46201 A92-46201 A92-46201 A92-46201 A92-46201 A92-46206	* #
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3425	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 * # A92-48918 * # A92-48918 * # A92-48927 # A92-48937 * # A92-48938 * # A92-48938 # A92-48940 * # A92-48940 * # A92-48940 * # A92-48940 * # A92-48940 # A92-48986 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7086 E-7109	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 908 p 833 p 871 p 910 p 868 p 868	N92-29997 # N92-29870 # N92-29877 # N92-28971 # N92-28900 # N92-28686 # N92-28680 * N92-28696 * N92-28696 * N92-30207 * N92-28434 * N92-30182 * N92-29136 * N92-29136 * N92-29136 * N92-29136 * N92-29136 * N92-28419 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56091-146-8	p 871 p 853 p 829 p 909 p 916 p 909 p 897 p 918 p 786 p 901 p 784 p 783 p 929 p 783 p 9862	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-45265 A92-45265 A92-45265 A92-45265 A92-45265 A92-45302 A92-45302 A92-45306	• # • # •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3369 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-34265	P 825 P 904 P 883 P 826 P 923 P 826 P 850 P 850 P 850 P 850 P 890 P 894 P 905	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48927 # A92-48928 # A92-48938 # A92-48938 # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-48946 # A92-48941 # A92-48946 # A92-48946 # A92-48946 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7109	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 884 . p 924 . p 908 . p 833 . p 871 . p 910 . p 868 . p 968 . p 968 . p 909	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 *# N92-30182 *# N92-30182 *# N92-29136 *# N92-28418 *# N92-28418 *# N92-28419 *# N92-28419 *# N92-28419 *#	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56091-146-8 ISBN 1-560347-011-X ISBN 5-02-029345-8	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 929 P 783 P 862 P 809	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45226 A92-45226 A92-45302 A92-45302 A92-46201 A92-45376 A92-46426 A92-46626	*##
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3466	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 905 P 905 P 905 P 865 P 865 P 865 P 865 P 865 P 865	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48927 # A92-48927 # A92-48937 * # A92-48938 * # A92-48939 * # A92-48939 * # A92-48939 * # A92-48940 * # A92-48940 * # A92-48984 * # A92-48984 # A92-48984 # A92-48984 # A92-49014 # A92-49015 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 884 . p 924 . p 908 . p 833 . p 871 . p 910 . p 868 . p 868 . p 929 . p 870	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28666 # N92-286673 * # N92-28666 * # N92-286434 * # N92-29136 * # N92-29136 * # N92-29136 * # N92-29448 * # N92-29156 * # N92-28418 * # N92-28419 * # N92-28195 * # N92-29905 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 929 P 929	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-4826 A92-48026 A92-48026 A92-48026 A92-46203 A92-46201 A92-45306 A92-46206 A92-46206 A92-46206 N92-28344	*##
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3469 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 890 P 905 P 905 P 905 P 865 P 894	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48918 * # A92-48937 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-49016 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7112 E-7113	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 908 p 833 p 871 p 910 p 868 p 868 p 868 p 868 p 909 p 870 p 890	N92-29977 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-28686 * N92-28696 * # N92-28666 * # N92-30207 * # N92-28434 * # N92-30182 * # N92-29186 * # N92-29186 * # N92-29187 * # N92-29188 * # N92-29185 * # N92-29985 * # N92-29985 * # N92-29985 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-803409-68-2 ISBN 1-55831-117-1 ISBN 1-56091-146-8 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 783 P 929 P 783 P 862 P 809 P 929 P 786	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-48426 A92-45226 A92-45302 A92-45302 A92-46201 A92-46426 A92-46626 N92-28344 N92-28522	
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3420 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3472	P 825 P 904 P 883 P 826 P 923 P 826 P 850 P 850 P 850 P 850 P 890 P 894 P 905 P 905 P 905 P 905 P 866 P 906 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48927 # A92-48938 # A92-48938 # A92-48939 * # A92-48940 # A92-48941 # A92-49015 # A92-49016 # A92-49016 # A92-49018 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7135 E-7148	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 884 . p 830 . p 887 . p 828 . p 998 . p 998 . p 833 . p 871 . p 910 . p 868 . p 909 . p 870 . p 890 . p 870 . p 890 . p 870 . p 898	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 *# N92-30182 *# N92-29136 *# N92-28418 *# N92-28419 *# N92-28419 *# N92-29105 *# N92-29343 *# N92-29343 *# N92-29343 *# N92-284674 *#	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-8093409-68-2 ISBN 1-55831-117-1 ISBN 1-560347-011-X ISBN 1-560347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1 ISBN-92-835-0657-X	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 901 P 783 P 862 P 809 P 783 P 862 P 809 P 9786 P 809	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45265 A92-48426 A92-48026 A92-45206 A92-45206 A92-45302 A92-46201 A92-45306 A92-46426 A92-46426 A92-46426 A92-46426 A92-46428 A92-28344 N92-28344	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3336 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3473	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 905 P 905 P 905 P 865 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48918 * # A92-48937 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-49016 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7112 E-7113	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 884 . p 830 . p 887 . p 828 . p 998 . p 998 . p 833 . p 871 . p 910 . p 868 . p 909 . p 870 . p 890 . p 870 . p 890 . p 870 . p 898	N92-29977 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-28686 * N92-28696 * # N92-28666 * # N92-30207 * # N92-28434 * # N92-30182 * # N92-29186 * # N92-29186 * # N92-29187 * # N92-29188 * # N92-29185 * # N92-29985 * # N92-29985 * # N92-29985 * #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-560347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0668-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 909 P 784 P 783 P 929 P 786 P 809 P 786 P 809 P 869 P 869	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48266 A92-48266 A92-48026 A92-45202 A92-46201 A92-45302 A92-46201 A92-45376 A92-4626 N92-28528 N92-28528 N92-28528 N92-28376 N92-28376 N92-28468	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3420 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3472	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 890 P 890 P 905 P 905 P 905 P 865 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48927 # A92-48938 # A92-48939 * # A92-48939 * # A92-48940 # A92-48941 # A92-49015 # A92-49016 # A92-49016 # A92-49018 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7135 E-7148	. p 859 . p 911 . p 853 . p 837 . p 870 . p 854 . p 830 . p 884 . p 830 . p 887 . p 828 . p 998 . p 998 . p 833 . p 871 . p 910 . p 868 . p 909 . p 870 . p 890 . p 870 . p 890 . p 870 . p 898	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 *# N92-30182 *# N92-29136 *# N92-28418 *# N92-28419 *# N92-28419 *# N92-29105 *# N92-29343 *# N92-29343 *# N92-29343 *# N92-284674 *#	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-146-8 ISBN 1-55831-117-1 ISBN 1-56091-1146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 809 P 783 P 809 P 783 P 809 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45302 A92-45302 A92-45302 A92-46201 A92-46302 A92-46626 N92-28344 N92-28522 N92-28346 N92-28346 N92-28346 N92-28468 N92-28468	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3335 AIAA PAPER 92-3336 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3468 AIAA PAPER 92-3467 AIAA PAPER 92-3473	P 825 P 904 P 883 P 826 P 826 P 923 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48927 * # A92-48927 # A92-48927 * # A92-48938 * # A92-48939 * # A92-48939 * # A92-48940 * # A92-48984 * # A92-48960 * # A92-49016 # A92-49011 # A92-49018 # A92-49018 # A92-49019 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7135 E-7148	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 885 p 837 p 870 p 854 p 909 p 870 p 868 p 933 p 871 p 910 p 868 p 939 p 870 p 870 p 888 p 831	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 *# N92-30182 *# N92-29136 *# N92-28418 *# N92-28419 *# N92-28419 *# N92-29105 *# N92-29343 *# N92-29343 *# N92-29343 *# N92-284674 *#	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-560347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0668-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 809 P 783 P 809 P 783 P 809 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45302 A92-45302 A92-45302 A92-46201 A92-46302 A92-46626 N92-28344 N92-28522 N92-28346 N92-28346 N92-28346 N92-28468 N92-28468	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3466 AIAA PAPER 92-3420 AIAA PAPER 92-3427 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3466 AIAA PAPER 92-3467 AIAA PAPER 92-3472 AIAA PAPER 92-3472 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3478	P 825 P 904 P 883 P 826 P 923 P 826 P 850 P 850 P 850 P 850 P 894 P 905 P 894 P 905 P 905 P 905 P 865 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48927 # A92-48938 # A92-48939 * # A92-48938 # A92-48940 * # A92-48941 # A92-49015 # A92-49016 # A92-49016 # A92-49018 # A92-49010 # A92-49010 # A92-49010 # A92-49010 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7112 E-7113 E-7113 E-7113 E-7135 E-7148 E-7175	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 885 p 837 p 870 p 854 p 909 p 870 p 868 p 933 p 871 p 910 p 868 p 939 p 870 p 870 p 888 p 831	N92-29997 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-28696 * N92-28696 * N92-28696 * N92-28696 * N92-28434 * N92-29180 # N92-28418 * N92-2918 * N92-29402 * N92-29343 * N92-29343 * N92-29343 * N92-29343 * N92-29343 * N92-29342 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-146-8 ISBN 1-55831-117-1 ISBN 1-56091-1146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 809 P 783 P 809 P 783 P 809 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800 P 800	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45302 A92-45302 A92-45302 A92-46201 A92-46302 A92-46626 N92-28344 N92-28522 N92-28346 N92-28346 N92-28346 N92-28468 N92-28468	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3469 AIAA PAPER 92-3429 AIAA PAPER 92-3469 AIAA PAPER 92-3467 AIAA PAPER 92-3467 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3478	P 825 P 906 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 905 P 865 P 865 P 866 P 866 P 866 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48927 # A92-48927 # A92-48927 # A92-48927 # A92-48938 * # A92-48939 * # A92-48938 # A92-48940 * # A92-49016 # A92-49016 # A92-49016 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49021 # A92-49021 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7058 E-7112 E-7113 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 854 p 830 p 868 p 924 p 908 p 868 p 868 p 868 p 868 p 869 p 870 p 890 p 870 p 890	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28666 * N92-28434 * N92-29661 * N92-29434 * N92-29136 * N92-28418 * N92-28419 * N92-28419 * N92-29343 * N92-29343 * N92-29343 * N92-29402 * N92-29159 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-146-8 ISBN 1-55831-117-1 ISBN 1-56091-1146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0668-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 783 P 783 P 862 P 809 P 783 P 862 P 809 P 783 P 868 P 868 P 859 P 859	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-4526 A92-4826 A92-4526 A92-4526 A92-46201 A92-45376 A92-46201 A92-46201 N92-28528 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28469	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3478	P 825 P 904 P 883 P 826 P 983 P 826 P 923 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48918 * # A92-48923 * # A92-48938 # A92-48938 # A92-48939 * # A92-48940 * # A92-48940 * # A92-48940 * # A92-49014 # A92-49015 # A92-49015 # A92-49016 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49021 # A92-49021 # A92-49022 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7112 E-7113 E-7112 E-7113 E-7115 E-7148 E-7175 ESA-TT-1247 ETN-92-91207	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 885 p 924 p 908 p 924 p 908 p 968 p 968 p 830 p 871 p 910 p 868 p 868 p 809 p 870	N92-29997 # N92-29870 # N92-29877 # N92-28971 # N92-28900 # N92-28686 # N92-28696 *# N92-28696 *# N92-28696 *# N92-28434 *# N92-29130 *# N92-29401 *# N92-29402 *# N92-29402 *# N92-29159 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-9194-0428-4 ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-91-8035-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0674-X ISBN-92-835-0674-X ISBN-92-835-0675-8	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 809 P 783 P 809 P 783 P 809 P 800 P 800 P 800 P 800 P 800 P 800 P 800	N92-29425 N92-29110 N92-28729 N92-29148 N92-29148 N92-29099 N92-29148 N92-29099 N92-248426 A92-45226 A92-46201 A92-45376 A92-46201 A92-45376 A92-4626 N92-28376 N92-28468 N92-28468 N92-28469 N92-28469 N92-28469	**
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3466 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3465 AIAA PAPER 92-3466 AIAA PAPER 92-3467 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3488 AIAA PAPER 92-3488 AIAA PAPER 92-3488	P 825 P 904 P 883 P 826 P 923 P 826 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48917 # A92-48917 * # A92-48917 * # A92-48927 # A92-48927 # A92-48928 # A92-48938 # A92-48939 * # A92-48939 * # A92-48940 # A92-48941 # A92-49015 # A92-49016 # A92-49010 # A92-49020 # A92-49021 # A92-49021 # A92-49022 # A92-49024 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-71175 ESA-TT-1247 ETN-92-91207 ETN-92-91325	p 859 p 911 p 853 p 837 p 870 p 870 p 854 p 830 p 887 p 828 p 924 p 908 p 831 p 868 p 909 p 870 p 868 p 909 p 870 p 870 p 828 p 831 p 830 p 831 p 830 p 831	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 * N92-28696 * N92-28696 * N92-28434 * N92-30182 * N92-29661 * N92-29136 * N92-28418 * N92-29155 * N92-29402 * N92-29159 # N92-29159 # N92-29159 # N92-29159 # N92-29159 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56347-011-X ISBN 1-56347-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0675-8 ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80350	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 783 P 829 P 783 P 829 P 783 P 859 P 859	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45265 A92-45265 A92-45265 A92-45265 A92-45302 A92-45302 A92-46201 A92-46426 A92-46626 A92-46626 N92-28344 N92-28468 N92-28468 N92-28468 N92-28469 N92-28469 N92-28469	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3468 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3484 AIAA PAPER 92-3488	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 866 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 * # A92-48917 * # A92-48917 * # A92-48918 * # A92-48927 # A92-48927 # A92-48928 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-48940 * # A92-48940 * # A92-48916 # A92-49018 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49022 # A92-49022 # A92-49024 # A92-49025 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7019 E-7046 E-7058 E-7060 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91326	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 820 p 894 p 908 p 831 p 868 p 868 p 868 p 869 p 831 p 870 p 890	N92-29997 # N92-29870 # N92-29877 # N92-28977 # N92-28900 # N92-28686 # N92-28673 * # N92-28673 * # N92-28696 * # N92-28434 * # N92-29136 * # N92-29136 * # N92-28418 * # N92-28419 * # N92-29136 * # N92-29137 * # N92-29139 * # N92-29159 # N92-29166 # N92-29159 # N92-29166 # N92-29159 # N92-29166 # N92-29169 # N92-29169 # N92-29169 # N92-2906 # N92-28788 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-117-1 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN 92-835-0656-1 ISBN 92-835-0656-1 ISBN 92-835-0657-X ISBN 92-835-0674-X ISBN 92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80352 JTN-92-80352	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 783 P 929 P 783 P 862 P 809 P 859 P 859	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45264 A92-45262 A92-45262 A92-45262 A92-46201 A92-45376 A92-46626 N92-28344 N92-28522 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3486 AIAA PAPER 92-3484 AIAA PAPER 92-3486	P 825 P 904 P 883 P 826 P 983 P 826 P 826 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 * # A92-48917 # A92-48917 * # A92-48918 * # A92-48917 * # A92-48918 * # A92-48923 * # A92-48923 * # A92-48938 * # A92-48938 * # A92-48939 * # A92-48939 * # A92-48940 * # A92-49014 # A92-49015 # A92-49015 # A92-49016 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49022 # A92-49023 # A92-49024 # A92-49025 # A92-49025 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7112 E-7113 E-7113 E-7115 E-7115 ESA-TT-1247 ETN-92-91326 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91326	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 854 p 932 p 924 p 908 p 947 p 918 p 868 p 949 p 870	N92-29997 # N92-29870 # N92-29877 # N92-28971 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28666 * N92-28434 * N92-29466 * N92-28438 * N92-29402 * N92-29402 * N92-29159 # N92-29159 # N92-29159 # N92-29159 # N92-29788 # N92-28788 # N92-28788 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-117-1 ISBN 1-56091-1146-8 ISBN 1-56091-1146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0657-X ISBN-92-835-0674-X ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80352 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80362	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 829 P 783 P 829 P 783 P 850 P 850 P 850 P 850 P 850 P 850 P 850 P 868 P 869 P 869	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 N92-29099 N92-29099 N92-28522 N92-28522 N92-284626 N92-28628 N92-28468 N92-28469 N92-28469 N92-28829 N92-28835 N92-28835 N92-28836	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3468 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3488 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3488 AIAA PAPER 92-3488 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3489 AIAA PAPER 92-3489 AIAA PAPER 92-3484 AIAA PAPER 92-3489 AIAA PAPER 92-3489 AIAA PAPER 92-3489 AIAA PAPER 92-3489	P 825 P 904 P 883 P 826 P 908 P 850 P 850 P 850 P 850 P 890 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48923 * # A92-48938 # A92-48939 * # A92-48930 * # A92-48930 * # A92-48940 * # A92-48940 * # A92-48940 * # A92-49016 # A92-49016 # A92-49017 # A92-49018 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49028 # A92-49028 # A92-49028 # A92-49028 # A92-49028 # A92-49028 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-71175 ESA-TT-1247 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91326	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 908 p 833 p 871 p 910 p 868 p 939 p 870 p 870 p 888 p 939 p 871 p 910 p 868 p 939 p 870	N92-29997 # N92-29870 # N92-29877 # N92-28677 # N92-28900 # N92-28686 # N92-28686 * N92-28696 * # N92-28696 * # N92-28696 * # N92-28434 * # N92-29136 * # N92-29139 * # N92-29159 # N92-29159 # N92-29159 # N92-29159 # N92-29789 # N92-29789 # N92-29789 # N92-29789 # N92-29683 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-117-1 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN 92-835-0656-1 ISBN 92-835-0656-1 ISBN 92-835-0657-X ISBN 92-835-0674-X ISBN 92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80352 JTN-92-80352	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 784 P 783 P 829 P 783 P 829 P 783 P 850 P 850 P 850 P 850 P 850 P 850 P 850 P 868 P 869 P 869	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 N92-29099 N92-29099 N92-28522 N92-28522 N92-284626 N92-28628 N92-28468 N92-28469 N92-28469 N92-28829 N92-28835 N92-28835 N92-28836	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3468 AIAA PAPER 92-3420 AIAA PAPER 92-3426 AIAA PAPER 92-3426 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3488 AIAA PAPER 92-3486 AIAA PAPER 92-3495 AIAA PAPER 92-35524	P 825 P 906 P 840 P 850 P 905 P 905 P 905 P 905 P 865 P 866 P 878 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48917 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48928 # A92-48938 # A92-48938 # A92-48938 # A92-48940 * # A92-48940 * # A92-48940 # A92-49015 # A92-49016 # A92-49018 # A92-49018 # A92-49019 # A92-49021 # A92-49021 # A92-49022 # A92-49022 # A92-49023 # A92-49024 # A92-49025 # A92-49028 # A92-49029 # A92-49021 # A92-49029 # A92-49021 # A92-49023 # A92-49024 # A92-49024 # A92-49024 # A92-49029 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91327 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91390	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 908 p 831 p 910 p 868 p 868 p 868 p 868 p 868 p 868 p 87 p 870 p 870 p 890 p 870 p 890 p 870 p 890 p 870 p 890 p 890 p 890 p 890 p 980 p 890 p 980 p 890 p 980	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-28673 * # N92-28673 * # N92-28696 * # N92-28434 * # N92-29136 * # N92-28418 * # N92-28419 * # N92-28419 * # N92-29155 * # N92-29305 * # N92-29159 # N92-29168 # N92-28789 # N92-28789 # N92-29870 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-6031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-117-1 ISBN 1-56947-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-016-036174-5 ISBN-92-835-0665-1 ISBN-92-835-0668-5 ISBN-92-835-067-X ISBN-92-835-067-X ISBN-92-8035-0675-8 JTN-92-80350 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80363	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 783 P 783 P 862 P 809 P 783 P 862 P 809 P 850 P 850	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45263 A92-45263 A92-45262 A92-45262 A92-45262 A92-45302 A92-46201 A92-45302 A92-46426 A92-46426 A92-283468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28829 N92-28823 N92-28823 N92-28823 N92-28833 N92-28836 N92-28836 N92-28836 N92-28836	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3476 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3485 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3487 AIAA PAPER 92-3489	P 825 P 904 P 883 P 826 P 908 P 826 P 850 P 850 P 850 P 850 P 890 P 905 P 905 P 905 P 865 P 865 P 866 P 906 P 906 P 906 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * N92-29343 * # A92-48918 * # A92-48927 * A92-48928 * # A92-48938 # A92-48939 * # A92-48930 * # A92-48930 * # A92-48930 * # A92-48931 * # A92-49010 # A92-49011 # A92-49010 # A92-49020 # A92-49020 # A92-49020 # A92-49001 # A92-490020 # A92-49004 # A92-49004 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91320 ETN-92-91321 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91390 ETN-92-91390 ETN-92-91390 ETN-92-91390	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 837 p 854 p 930 p 854 p 933 p 871 p 916 p 933 p 871 p 930 p 830 p 939 p 990 p 990 p 992 p 9190	N92-29997 # N92-29870 # N92-29877 # N92-28980 # N92-28686 # N92-28663 * N92-28663 * N92-28666 * N92-28666 * N92-28644 * N92-29136 * N92-29448 * N92-29449 * N92-29402 * N92-29402 * N92-29402 * N92-29159 # N92-29159 # N92-29159 # N92-29768 # N92-29768 # N92-29768 # N92-29878 # N92-29878 # N92-29870 # N92-29870 # N92-29870 # N92-29870 # N92-29870 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-117-1 ISBN 1-56091-1146-8 ISBN 1-56091-1146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0657-X ISBN-92-835-0674-X ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80352 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80362	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 783 P 783 P 862 P 809 P 783 P 862 P 809 P 850 P 850	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45263 A92-45263 A92-45262 A92-45262 A92-45262 A92-45302 A92-46201 A92-45302 A92-46426 A92-46426 A92-283468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28829 N92-28823 N92-28823 N92-28823 N92-28833 N92-28836 N92-28836 N92-28836 N92-28836	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3465 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3465 AIAA PAPER 92-3466 AIAA PAPER 92-3472 AIAA PAPER 92-3472 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3491 AIAA PAPER 92-3491 AIAA PAPER 92-3495 AIAA PAPER 92-3455 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3524	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 865 P 865 P 866 P 878 P 878 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 * # A92-48917 # A92-48917 * # A92-48917 * # A92-48927 * # A92-48927 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-48940 * # A92-49016 # A92-49018 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49021 # A92-49020 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7113 E-7113 E-7115 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91342 ETN-92-91390 ETN-92-91391 ETN-92-91391 ETN-92-91391	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 988 p 833 p 871 p 968 p 999 p 870 p 868 p 999 p 870 p 880 p 830 p 887 p 999 p 970 p 890 p 980 p 980 p 980 p 990	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 *# N92-29661 *# N92-29136 *# N92-29136 *# N92-28418 *# N92-29136 *# N92-29137 *# N92-29138 *# N92-29139 *# N92-29139 *# N92-29139 *# N92-29343 *# N92-29349 *	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55631-117-1 ISBN 1-56091-146-8 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0674-X ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80360 JTN-92-80362 JTN-92-80363 JTN-92-80363 JTN-92-80363 IN-92-80363 IN-92-80363	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 890 P 897 P 783 P 862 P 899 P 859 P 859 P 859 P 858 P 868 P 898 P 852	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45265 A92-45265 A92-45265 A92-45265 A92-45302 A92-45302 A92-46201 A92-45376 A92-46426 N92-28468 N92-28468 N92-28468 N92-28469 N92-28469 N92-28469 N92-28469 N92-28469 N92-28469 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836	•• • • • • • • • • • • • • • • • • • • •
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3469 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3468 AIAA PAPER 92-3465 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3486 AIAA PAPER 92-3488 AIAA PAPER 92-3488 AIAA PAPER 92-3481 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3487 AIAA PAPER 92-3486 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 905 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48911 # A92-48915 # A92-48916 * # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48928 # A92-48938 # A92-48938 # A92-48938 # A92-48938 # A92-48940 # A92-48941 # A92-49015 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49025 # A92-49028 # A92-49028 # A92-49029 # A92-49029 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49031 # A92-49048 # A92-49064 # A92-49064 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91320 ETN-92-91321 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91390 ETN-92-91390 ETN-92-91390 ETN-92-91390	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 924 p 988 p 833 p 871 p 968 p 999 p 870 p 868 p 999 p 870 p 880 p 830 p 887 p 999 p 970 p 890 p 980 p 980 p 980 p 990	N92-29997 # N92-29870 # N92-29877 # N92-28980 # N92-28686 # N92-28663 * N92-28663 * N92-28666 * N92-28666 * N92-28644 * N92-29136 * N92-29448 * N92-29449 * N92-29402 * N92-29402 * N92-29402 * N92-29159 # N92-29159 # N92-29159 # N92-29768 # N92-29768 # N92-29768 # N92-29878 # N92-29878 # N92-29870 # N92-29870 # N92-29870 # N92-29870 # N92-29870 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-117-1 ISBN 1-56947-101-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-067-X ISBN-92-80350 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80363 JTN-92-80381 KU-FRL-872-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 784 P 783 P 862 P 809 P 783 P 850 P 850 P 850 P 851 P 887 P 888 P 888	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45262 A92-45262 A92-45202 A92-46201 A92-45302 A92-46201 A92-45302 A92-466201 A92-28346 N92-28458 N92-28468 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28833 N92-28833 N92-28830 N92-288901 N92-28720 N92-28720 N92-28770	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3465 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3465 AIAA PAPER 92-3466 AIAA PAPER 92-3472 AIAA PAPER 92-3472 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3484 AIAA PAPER 92-3491 AIAA PAPER 92-3491 AIAA PAPER 92-3495 AIAA PAPER 92-3455 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3524	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 905 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48911 # A92-48915 # A92-48916 * # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48928 # A92-48938 # A92-48938 # A92-48938 # A92-48938 # A92-48940 # A92-48941 # A92-49015 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49025 # A92-49028 # A92-49028 # A92-49029 # A92-49029 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49031 # A92-49048 # A92-49064 # A92-49064 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7113 E-7113 E-7115 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91342 ETN-92-91390 ETN-92-91391 ETN-92-91391 ETN-92-91391	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 887 p 828 p 930 p 870 p 870 p 868 p 909 p 870 p 800 p 830 p 930 p 920 p 920	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28666 * N92-28434 * N92-286434 * N92-29165 * N92-28418 * N92-29155 * N92-29343 * N92-29159 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-117-1 ISBN 1-56091-1146-8 ISBN 1-56391-117-1 ISBN 1-56391-117-1 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0657-X ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80363 JTN-92-80363 JTN-92-80363 L-16096 L-17025	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 783 P 783 P 929 P 783 P 859 P 850 P 850 P 851 P 886 P 851 P 888 P 888	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45202 A92-45302 A92-45302 A92-45302 A92-45302 A92-46201 A92-45376 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28835 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28720 N92-287720 N92-28774	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3469 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3468 AIAA PAPER 92-3465 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3486 AIAA PAPER 92-3488 AIAA PAPER 92-3488 AIAA PAPER 92-3481 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3487 AIAA PAPER 92-3486 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524	P 825 P 904 P 883 P 826 P 908 P 850 P 850 P 850 P 850 P 890 P 894 P 905 P 905 P 905 P 866 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48918 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48939 * # A92-48939 * # A92-48940 * # A92-49019 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49021 # A92-49024 # A92-49024 # A92-49024 # A92-49024 # A92-49024 # A92-49049 # A92-49063 * # A92-49064 # A92-49064 # A92-49064 # A92-49064 # A92-49064 # A92-49066 # A92-49068 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91327 ETN-92-91329 ETN-92-91390 ETN-92-91390 ETN-92-91390 ETN-92-91401 ETN-92-91401 ETN-92-91401	P 859 P 911 P 853 P 870 P 854 P 830 P 854 P 830 P 854 P 830 P 871 P 916 P 858 P 858 P 851 P 870	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28666 * N92-28434 * N92-286434 * N92-29165 * N92-28418 * N92-29155 * N92-29343 * N92-29159 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-117-1 ISBN 1-56947-101-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-067-X ISBN-92-80350 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80363 JTN-92-80381 KU-FRL-872-5	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 901 P 783 P 783 P 929 P 783 P 859 P 850 P 850 P 851 P 886 P 851 P 888 P 888	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-48426 A92-45226 A92-45226 A92-45202 A92-45302 A92-45302 A92-45302 A92-45302 A92-46201 A92-45376 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28468 N92-28835 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28720 N92-287720 N92-28774	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3334 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3468 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3476 AIAA PAPER 92-3483 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3481 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3549 AIAA PAPER 92-35549 AIAA PAPER 92-35549 AIAA PAPER 92-35570	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * # A92-48917 * # A92-48917 * # A92-48927 * # A92-48938 * # A92-48937 * # A92-48938 * # A92-48938 * # A92-48938 # A92-48940 * # A92-48940 * # A92-49016 # A92-49018 # A92-49018 # A92-49019 # A92-49019 # A92-49010 # A92-49020 # A92-49000 # A92-49	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7113 E-7115 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91329 ETN-92-91342 ETN-92-91342 ETN-92-91390 ETN-92-91401 ETN-92-91401 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91405	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 837 p 870 p 854 p 830 p 887 p 870	N92-29977 # N92-29877 # N92-28877 # N92-28900 # N92-28980 # N92-28666 # N92-286673 * # N92-286673 * # N92-28666 * # N92-28666 * # N92-286418 * # N92-284418 * # N92-284418 * # N92-284418 * # N92-29402 * # N92-29955 * # N92-29955 * # N92-29968 # N92-29159 # N92-29168 # N92-28788 # N92-28788 # N92-28851 # N92-286649 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-011-X ISBN 1-56947-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-067-X ISBN-92-835-0675-8 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80381 KU-FRL-872-5 L-16996 L-17025 L-17094	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 783 P 862 P 809 P 783 P 850 P 850 P 850 P 851 P 853 P 853 P 853 P 852 P 852 P 852 P 855 P 855 P 855 P 855 P 856 P 856	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45262 A92-45206 A92-45206 A92-45302 A92-46201 A92-45302 A92-46426 A92-466201 A92-28346 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28459 N92-28833 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836	·· · · · · · · · · · · · · · · · · · ·
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3364 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3367 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3426 AIAA PAPER 92-3427 AIAA PAPER 92-3426 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3466 AIAA PAPER 92-3476 AIAA PAPER 92-3472 AIAA PAPER 92-3472 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3486 AIAA PAPER 92-3495 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3564 AIAA PAPER 92-3564	P 825 P 906 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 * # A92-48917 # A92-48917 * # A92-48927 # A92-48927 # A92-48938 # A92-48938 * # A92-48938 * # A92-48938 # A92-48939 * # A92-48940 # A92-48941 # A92-48941 # A92-48941 # A92-49016 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49025 # A92-49026 # A92-49027 # A92-49028 # A92-49031 # A92-49049 # A92-49063 * # A92-49064 # A92-49063 * # A92-49064 # A92-49065 # A92-49066 # A92-49066 # A92-49066 # A92-49066 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7058 E-7109 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91328 ETN-92-91329 ETN-92-91390 ETN-92-91390 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91436	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 870 P 854 P 908 P 831 P 870 P 870 P 870 P 870 P 870 P 870 P 890	N92-29997 # N92-29870 # N92-29877 # N92-28771 # N92-28900 # N92-28686 # N92-28673 * # N92-286673 * # N92-28666 * # N92-28434 * # N92-28434 * # N92-29165 * # N92-28418 * # N92-28418 * # N92-28418 * # N92-28419 * # N92-28419 * # N92-29155 * # N92-29159 # N92-28663 # N92-28653 # N92-28651 # N92-28652 # N92-28653 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-807263-406-X ISBN 0-8031-117-1 ISBN 1-56091-1146-8 ISBN 1-56391-117-1 ISBN 1-56391-117-1 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0657-X ISBN-92-835-0657-X ISBN-92-835-0675-8 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80350 JTN-92-80363 JTN-92-80363 JTN-92-80363 L-16096 L-17025	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 783 P 862 P 809 P 783 P 850 P 850 P 850 P 851 P 853 P 853 P 853 P 852 P 852 P 852 P 855 P 855 P 855 P 855 P 856 P 856	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45262 A92-45206 A92-45206 A92-45302 A92-46201 A92-45302 A92-46426 A92-466201 A92-28346 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28459 N92-28833 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836	·· · · · · · · · · · · · · · · · · · ·
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3334 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3469 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3483 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3481 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-35464 AIAA PAPER 92-3664 AIAA PAPER 92-3666	P 825 P 904 P 883 P 826 P 826 P 850 P 850 P 850 P 850 P 850 P 890 P 894 P 905 P 905 P 905 P 865 P 865 P 866 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48918 * # A92-48938 * # A92-48939 * # A92-48940 * # A92-49016 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49024 # A92-49025 # A92-49025 # A92-49038 # A92-49064 # A92-49064 # A92-49066 # A92-49066 # A92-49066 # A92-49066 # A92-49067 # A92-49087 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7112 E-7112 E-7113 E-7115 E-7112 E-71175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91325 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91328 ETN-92-91390 ETN-92-91391 ETN-92-91401 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91435 ETN-92-91435 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91436	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 854 P 830 P 870 P 854 P 830 P 871 P 916 P 830 P 871 P 916 P 830 P 871 P 917	N92-29977 # N92-29877 # N92-28677 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28666 * N92-28666 * N92-28644 * N92-286418 * N92-28448 * N92-29136 * N92-29366 * N92-2936 * N92-29402 * N92-29159 # N92-28654 # N92-28654 # N92-28654 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56347-011-X ISBN 1-56947-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-067-X ISBN-92-835-0675-8 JTN-92-80362 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80381 KU-FRL-872-5 L-16996 L-17025 L-17094	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 783 P 862 P 809 P 783 P 850 P 850 P 850 P 851 P 853 P 853 P 853 P 852 P 852 P 852 P 855 P 855 P 855 P 855 P 856 P 856	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45262 A92-45206 A92-45206 A92-45302 A92-46201 A92-45302 A92-46426 A92-466201 A92-28346 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28458 N92-28459 N92-28833 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836 N92-28836	·· · · · · · · · · · · · · · · · · · ·
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3426 AIAA PAPER 92-3429 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3485 AIAA PAPER 92-3485 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3554 AIAA PAPER 92-3564 AIAA PAPER 92-3564 AIAA PAPER 92-3666	P 825 P 904 P 883 P 826 P 908 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * N92-29343 * # A92-48927 * A92-48938 * A92-48937 * # A92-48938 * A92-48938 * A92-48939 * # A92-48940 * A92-48940 * A92-49016 # A92-49016 # A92-49017 # A92-49018 # A92-49018 # A92-49018 # A92-49019 # A92-49019 # A92-49010	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7114 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91329 ETN-92-91329 ETN-92-91327 ETN-92-91320 ETN-92-91327 ETN-92-91327 ETN-92-91327 ETN-92-91401 ETN-92-91401 ETN-92-91403 ETN-92-91435 ETN-92-91435 ETN-92-91436	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 837 p 870 p 858 p 924 p 988 p 833 p 837 p 868 p 939 p 870 p 868 p 930 p 870 p 890	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-286434 *# N92-29136 *# N92-29136 *# N92-29136 *# N92-28418 *# N92-29136 *# N92-28419 *# N92-29136 *# N92-28419 *# N92-29105 *# N92-29105 *# N92-29105 *# N92-29105 *# N92-29105 *# N92-29105 *# N92-29109 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56391-117-1 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0675-8 JTN-92-80360 JTN-92-80361 KU-FRL-872-5 L-16996 L-17025 L-17094 LC-90-39761	P 871 P 873 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 909 P 897 P 918 P 783 P 862 P 829 P 859 P 859 P 859 P 858 P 851 P 868 P 852 P 827 P 892 P 929	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-47035 A92-45266 A92-45226 A92-45226 A92-45226 A92-45302 A92-45302 A92-46201 A92-45302 A92-46626 N92-28468 N92-28468 N92-28468 N92-28469 N92-28469 N92-28469 N92-28469 N92-28474 N92-28720 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740 N92-28740	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3336 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3367 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3468 AIAA PAPER 92-3465 AIAA PAPER 92-3468 AIAA PAPER 92-3472 AIAA PAPER 92-3473 AIAA PAPER 92-3476 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3483 AIAA PAPER 92-3484 AIAA PAPER 92-3486 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3548 AIAA PAPER 92-3549 AIAA PAPER 92-3564 AIAA PAPER 92-3666	P 825 P 906 P 850 P 8905 P 905 P 905 P 905 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48917 # A92-48917 # A92-48917 * # A92-48927 # A92-48927 # A92-48938 # A92-48938 # A92-48939 * # A92-48939 * # A92-48939 * # A92-48939 # A92-48940 # A92-48940 # A92-49016 # A92-49016 # A92-49017 # A92-49018 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49021 # A92-49021 # A92-49021 # A92-49021 # A92-49022 # A92-49023 # A92-49024 # A92-49024 # A92-49025 # A92-49026 # A92-49027 # A92-49028 # A92-49031 # A92-49049 # A92-49063 * # A92-49064 # A92-49064 # A92-49068 # A92-49076 # A92-49087 # A92-49088 # A92-49096 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91328 ETN-92-91329 ETN-92-91390 ETN-92-91391 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91438	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 870 P 854 P 908 P 831 P 870 P 870 P 828 P 831 P 830	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28663 * N92-28666 * N92-28666 * N92-28644 * N92-28644 * N92-28673 * N92-28673 * N92-28643 * N92-28643 * N92-28136 * N92-28138 # N92-29159 # N92-28663 # N92-28683 # N92-28683 # N92-28654 # N92-28654 # N92-28654 # N92-28664 # N92-28664 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-560347-011-X ISBN 1-560347-011-X ISBN 1-560347-011-X ISBN 5-02-029345-8 ISBN-92-835-0666-1 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-0674-X ISBN-92-835-0675-8 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80363 JTN-92-80363 ITN-92-80363 ITN-92-80365 L-17094 LC-90-39761 LR-662	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 896 P 897 P 783 P 862 P 809 P 859 P 850 P 868 P 888 P 888 P 888 P 909 P 852 P 852 P 895 P 912 P 887	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45262 A92-45262 A92-46201 A92-45302 A92-46201 A92-45302 A92-46626 A92-46626 N92-28344 N92-28468 N92-28468 N92-28468 N92-28469 N92-28469 N92-28833 N92-28836	•••••••
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3325 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3333 AIAA PAPER 92-3334 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3350 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3469 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3460 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3525 AIAA PAPER 92-3526 AIAA PAPER 92-3566 AIAA PAPER 92-3666 AIAA PAPER 92-3714 AIAA PAPER 92-3717	P 825 P 904 P 883 P 826 P 908 P 850 P 850 P 850 P 850 P 850 P 890 P 905 P 905 P 905 P 905 P 866 P 906	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48911 # A92-48915 # A92-48917 # A92-48917 # A92-48917 # A92-48918 * # A92-48918 * # A92-48938 * # A92-48938 * # A92-48938 * # A92-48939 * # A92-48940 * # A92-48940 * # A92-49016 # A92-49016 # A92-49018 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49019 # A92-49020 # A92-49021 # A92-49025 # A92-49026 # A92-49027 # A92-49088 # A92-49088 # A92-49088 # A92-49088 # A92-49098 # A92-49098 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7112 E-7113 E-7115 E-7114 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91327 ETN-92-91401 ETN-92-91401 ETN-92-91401 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91405 ETN-92-91436 ETN-92-91437 ETN-92-91437 ETN-92-91437 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91440	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 837 P 870 P 854 P 830 P 871 P 916 P 830 P 871 P 916 P 830 P 871 P 916 P 870	N92-29977 # N92-29877 # N92-28677 # N92-28900 # N92-28686 # N92-28666 * N92-286673 * N92-28666 * N92-28666 * N92-28666 * N92-28644 * N92-28448 * N92-28448 * N92-29136 * N92-29366 * N92-2936 * N92-29402 * N92-29159 # N92-28654 # N92-28654 # N92-28655 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56391-117-1 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-0-16-036174-5 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0675-8 JTN-92-80360 JTN-92-80361 KU-FRL-872-5 L-16996 L-17025 L-17094 LC-90-39761	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 896 P 896 P 897 P 783 P 862 P 809 P 859 P 850 P 868 P 888 P 888 P 888 P 909 P 852 P 852 P 895 P 912 P 887	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45261 A92-45263 A92-45262 A92-45262 A92-45206 A92-45302 A92-45302 A92-46201 A92-45306 A92-46626 A92-46626 N92-28344 N92-28458 N92-28468 N92-28468 N92-28469 N92-28833 N92-28836	** * * * * * * * * * * * * * * * * * * *
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3426 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3486 AIAA PAPER 92-3486 AIAA PAPER 92-3488 AIAA PAPER 92-3489 AIAA PAPER 92-3495 AIAA PAPER 92-3495 AIAA PAPER 92-3491 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3566 AIAA PAPER 92-3668 AIAA PAPER 92-3668 AIAA PAPER 92-3668 AIAA PAPER 92-3668 AIAA PAPER 92-3714 AIAA PAPER 92-3717	P 825 P 904 P 883 P 826 P 908 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 866 P 906 P 906 P 906 P 906 P 906 P 906 P 868 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48910 # A92-48911 # A92-48915 # A92-48916 # A92-48917 * N92-29343 * # A92-48917 * A92-48927 # A92-48938 * # A92-48937 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-48940 * # A92-49016 # A92-49016 # A92-49017 # A92-49018 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49020 # A92-49021 # A92-49020 # A92-49020 # A92-49021 # A92-49021 # A92-49020 # A92-49021 # A92-49028 # A92-49028 # A92-49088 # A92-49088 # A92-49088 # A92-49088 # A92-49088 # A92-49098 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91327 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91401 ETN-92-91401 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91448	p 859 p 911 p 853 p 837 p 870 p 854 p 830 p 837 p 870 p 854 p 830 p 837 p 830 p 837	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28686 # N92-28686 # N92-28696 *# N92-28696 *# N92-28434 * # N92-29661 *# N92-29136 *# N92-29136 *# N92-29136 *# N92-29136 *# N92-29137 *# N92-29138 *# N92-29139 *# N92-29105 *# N92-29109 *# N92-29109 *# N92-29109 # N92-29109	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56391-117-1 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0675-8 JTN-92-80360 JTN-92-80360 JTN-92-80360 JTN-92-80362 JTN-92-80362 JTN-92-80363 IN-92-80363 IN-	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 909 P 897 P 918 P 783 P 862 P 899 P 859 P 859 P 859 P 858 P 852 P 857 P 852 P 827 P 992 P 887 P 923	N92-29425 N92-29110 N92-28729 N92-29099 N92-29148 N92-29099 A92-45261 A92-45265 A92-45266 A92-45266 A92-45266 A92-45302 A92-45302 A92-46201 A92-45302 A92-46201 A92-28376 A92-46626 N92-28468 N92-28468 N92-28469 N92-28469 N92-28469 N92-28469 N92-28469 N92-28470 N92-28470 N92-28470 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28374 N92-28579 N92-28579 N92-28579 N92-28581	•••••••
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3346 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3366 AIAA PAPER 92-3468 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3429 AIAA PAPER 92-3429 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3465 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3470 AIAA PAPER 92-3478 AIAA PAPER 92-3478 AIAA PAPER 92-3484 AIAA PAPER 92-3491 AIAA PAPER 92-3491 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3525 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-3524 AIAA PAPER 92-35266 AIAA PAPER 92-3666 AIAA PAPER 92-3717 AIAA PAPER 92-3717 AIAA PAPER 92-3727 AIAA PAPER 92-3728	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48938 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-49016 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49020 # A92-49021 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49080 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7113 E-7115 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91326 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91329 ETN-92-91329 ETN-92-91401 ETN-92-91403 ETN-92-91406 ETN-92-91436 ETN-92-91439 ETN-92-91440 ETN-92-91440 ETN-92-91446	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 870 P 854 P 830 P 870	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28900 # N92-28686 # N92-28663 * N92-28696 * # N92-286434 * N92-286434 * N92-29150 * N92-28418 * N92-29155 * N92-28418 * N92-29155 * N92-29155 * N92-29159 # N92-28663 # N92-28663 # N92-28654 # N92-28655 # N92-28655 # N92-28655 # N92-28655 # N92-28655 # N92-28657 # N92-286657 # N92-286657 # N92-286637 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-55831-117-1 ISBN 1-56031-146-8 ISBN 1-56347-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0666-1 ISBN-92-835-0668-5 ISBN-92-835-0668-5 ISBN-92-835-0675-8 JTN-92-80362 JTN-92-80362 JTN-92-80363 JTN-92-80363 JTN-92-80363 JTN-92-80363 ITN-92-80363 ITN-92-80363 ITN-92-80363 ITN-92-80361 L-17094 LC-90-39761 LR-662 LR-665 MBB-FE-2-S-PUB-472	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 786 P 789 P 783 P 862 P 809 P 850 P 850 P 850 P 851 P 867 P 895 P 852 P 897 P 912 P 897	N92-29425 N92-29110 N92-29110 N92-29099 N92-29148 N92-29099 N92-29148 N92-29099 N92-29148 N92-245226 A92-45226 A92-45226 A92-45226 A92-45226 A92-46201 A92-45376 A92-46626 N92-28468 N92-28468 N92-28468 N92-28469 N92-28478 N92-2872 N92-28579 N92-28550 N92-28550	•••••••••••••••••••••••••••••••••••••••
AIAA PAPER 92-3323 AIAA PAPER 92-3324 AIAA PAPER 92-3326 AIAA PAPER 92-3327 AIAA PAPER 92-3327 AIAA PAPER 92-3328 AIAA PAPER 92-3332 AIAA PAPER 92-3333 AIAA PAPER 92-3338 AIAA PAPER 92-3338 AIAA PAPER 92-3340 AIAA PAPER 92-3340 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3363 AIAA PAPER 92-3365 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3366 AIAA PAPER 92-3368 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3420 AIAA PAPER 92-3425 AIAA PAPER 92-3425 AIAA PAPER 92-3426 AIAA PAPER 92-3468 AIAA PAPER 92-3468 AIAA PAPER 92-3469 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3473 AIAA PAPER 92-3478 AIAA PAPER 92-3486 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3549 AIAA PAPER 92-3548 AIAA PAPER 92-3548 AIAA PAPER 92-3549 AIAA PAPER 92-3566 AIAA PAPER 92-3666 AIAA PAPER 92-3666 AIAA PAPER 92-3666 AIAA PAPER 92-3666 AIAA PAPER 92-3717	P 825 P 904 P 883 P 826 P 923 P 850 P 850 P 850 P 850 P 850 P 894 P 905 P 905 P 905 P 865 P 865 P 865 P 866	A92-48906 # A92-48908 * # A92-48909 * # A92-48911 # A92-48911 # A92-48915 # A92-48916 # A92-48917 # A92-48917 # A92-48917 # A92-48927 # A92-48927 # A92-48938 * # A92-48938 * # A92-48938 * # A92-48940 * # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-48941 # A92-49016 # A92-49018 # A92-49018 # A92-49019 # A92-49020 # A92-49020 # A92-49021 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49021 # A92-49020 # A92-49080 #	DLR-FB-91-34 DLR-MITT-91-10 DODA-AR-006-633 DOT/FAA/CT-TN91/32 DOT/FAA/CT-91/10 DOT/VNTSC-FAA-91-16 E-6354 E-6827 E-6930 E-7003 E-7019 E-7046 E-7058 E-7060 E-7086 E-7109 E-7112 E-7113 E-7113 E-7135 E-7148 E-7175 ESA-TT-1247 ETN-92-91207 ETN-92-91325 ETN-92-91325 ETN-92-91326 ETN-92-91327 ETN-92-91326 ETN-92-91327 ETN-92-91327 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91329 ETN-92-91401 ETN-92-91401 ETN-92-91403 ETN-92-91403 ETN-92-91403 ETN-92-91436 ETN-92-91436 ETN-92-91436 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91438 ETN-92-91448	P 859 P 911 P 853 P 870 P 870 P 854 P 830 P 870 P 854 P 830 P 870	N92-29997 # N92-29870 # N92-29877 # N92-28900 # N92-28900 # N92-28686 # N92-28663 * N92-28696 * # N92-286434 * N92-286434 * N92-29150 * N92-28418 * N92-29155 * N92-28418 * N92-29155 * N92-29155 * N92-29159 # N92-28663 # N92-28663 # N92-28654 # N92-28655 # N92-28655 # N92-28655 # N92-28655 # N92-28655 # N92-28657 # N92-286657 # N92-286657 # N92-286637 #	H-1806 H-1833 INT-PATENT-CLASS-B64C-3/14 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-F16C-32/04 INT-PATENT-CLASS-G01C-21/00 INT-PATENT-CLASS-H02K-1/14 ISBN 0-387-97475-X ISBN 0-444-88948-5 ISBN 0-7803-0084-X ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8031-1423-0 ISBN 0-8194-0428-4 ISBN 0-87263-406-X ISBN 0-903409-68-2 ISBN 1-56391-117-1 ISBN 1-56091-146-8 ISBN 1-56347-011-X ISBN 1-56347-011-X ISBN 5-02-029345-8 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0656-1 ISBN-92-835-0668-5 ISBN-92-835-0675-8 JTN-92-80360 JTN-92-80360 JTN-92-80360 JTN-92-80362 JTN-92-80362 JTN-92-80363 IN-92-80363 IN-	P 871 P 853 P 829 P 909 P 916 P 909 P 897 P 918 P 786 P 786 P 789 P 783 P 862 P 809 P 850 P 850 P 850 P 851 P 867 P 895 P 852 P 897 P 912 P 897	N92-29425 N92-29110 N92-29110 N92-29099 N92-29148 N92-29099 N92-29148 N92-29099 N92-29148 N92-245226 A92-45226 A92-45226 A92-45226 A92-45226 A92-46201 A92-45376 A92-46626 N92-28468 N92-28468 N92-28468 N92-28469 N92-28478 N92-2872 N92-28579 N92-28550 N92-28550	•••••••

REPORT NUMBER INDEX						SME	PAPE	R MR91-177
MPD FF 202 C DUB 0462 A	ROA	N92-29629 #	NASA-CR-186021 p	871	N92-29427 * #	ONERA, TP NO. 1992-22	n 822	492-48585
MBB-FE-202-S-PUB-0463-A p MBB-FE-202-S-PUB-0464-A p			NASA-CR-189171 p		N92-30207 * #	ONERA, TP NO. 1992-23		
MBB-FE-202-S-PUB-0468-A	832	N92-29713 #	NASA-CR-189207 p		N92-29402 * #	ONERA, TP NO. 1992-25		
MBB-FE-202-S-PUB-0469-A	831	N92-29649 #	NASA-CR-189595p	888	N92-29352 * #	ONERA, TP NO. 1992-27		A92-48589
			NASA-CR-189643p		N92-28556 * #	ONERA, TP NO. 1992-2		
MBB-UD-0603-91-PUB p	910	N92-29873 #	NASA-CR-190264 p		N92-29329 * # N92-28361 * #	ONERA, TP NO. 1992-31		
MBB-UD-0606-91-PUB	787	N92-29874 # N92-30076 #	NASA-CR-190400 p NASA-CR-190431 p		N92-28511 * #	ONERA, TP NO. 1992-36 ONERA, TP NO. 1992-39		A92-48597
MBB-UD-0610-91-PUB p	889	N92-30076 #	NASA-CR-190444p			ONERA, TP NO. 1992-40		
MBB/FE202/S/PUB/461 p	787	N92-30232 #	NASA-CR-190469 p		N92-28718 * #	ONERA, TP NO. 1992-41		A92-48602
			NASA-CR-190480p		N92-29361 * #	ONERA, TP NO. 1992-46	p 902	A92-48607
MCAT-92-011-PT-3 p	888	N92-29655 * #	NASA-CR-190535p		N92-29654 * #	ONERA, TP NO. 1992-47		
			NASA-CR-190541 p		N92-29655 * #	ONERA, TP NO. 1992-49		
MTL-TR-92-5 p	908	N92-28425 #	NASA-CR-190565 p NASA-CR-190570 p			ONERA, TP NO. 1992-59 ONERA, TP NO. 1992-7		
NADC-91087-60	895	N92-28921 #	NASA-CR-190576 p			ONERA, 17 NO. 1992-7	h 022	A32-403/3
NADC-91007-00	033	1452-20521 #	NASA-CR-4443p			OU/AEC-EER-92-2	p 840	N92-28718 * #
NAL-TM-632 p	887	N92-28829 #						
NAL-TM-634 p	888	N92-28835 #	NASA-SP-4104p	929	N92-28344 * #	PSU-TURBO-R-9201	p 909	N92-28879 #
NAL-TM-635 p	888	N92-28833 #	NASA-TM-102192p	070	NO2 20457 * #	DOLL TUDBO 0004	044	1100 00000 #
NAL-TM-636 p	909	N92-28836 #	NASA-TM-102192 p		N92-28457 # N92-28926 * #	PSU-TURBO-9201	p 911	N92-29933 #
NAL-TR-1112 p	853	N92-28901 #	NASA-TM-103892 p		N92-29104 * #	PW/GESP-FR2198-05	0.896	N92-29408 #
NAL-18-1112	000	N32-20301 π	NASA-TM-103902p		N92-28910 * #	1177 GEST 1112130-03	p 030	1402-20400 #
NAMRL-TM-91-2 p	883	N92-28407 #	NASA-TM-103906p		N92-29103 * #	R/D-6907-EE-06	p 927	N92-28923 #
·			NASA-TM-103915 p		N92-28909 * #			
NAS 1.15:102192 p			NASA-TM-103925 p			SAE AIR 1168/7	p 849	A92-48022
NAS 1.15:103873 p			NASA-TM-103929 p NASA-TM-104240 p		N92-29417 * # N92-29659 * #	SAE P-246	- 700	ADD 45076
NAS 1.15:103892 p	890	N92-29104 * # N92-28910 * #	NASA-TM-104247 p		N92-29425 * #	SAE P-246	p /83	A92-45376
NAS 1.15:103902 p : NAS 1.15:103906 p	841	N92-29103 * #	NASA-TM-105417 p		N92-28673 * #	SAE PAPER 911207	n 862	A92-48021
NAS 1.15:103905 p	927	N92-28909 * #	NASA-TM-105655p		N92-28434 * #	SAE PAPER 911973		A92-45380
NAS 1.15:103925 p	852		NASA-TM-105675 p	833	N92-30182 * #	SAE PAPER 911974		
NAS 1.15:103929p	854	N92-29417 * #	NASA-TM-105680 p		N92-29661 * #	SAE PAPER 911975	p 872	A92-45382
NAS 1.15:104240 p	871	N92-29659 * #	NASA-TM-105681p		N92-29136 * #	SAE PAPER 911976		A92-45383
NAS 1.15:104247 p	871	N92-29425 * #	NASA-TM-105698 p		N92-28418 * #	SAE PAPER 911979		
NAS 1.15:105417 p		N92-28673 * #	NASA-TM-105715 p NASA-TM-105716 p		N92-28419 * # N92-28985 * #	SAE PAPER 911980		
NAS 1.15:105655 p	908	N92-28434 * # N92-30182 * #	NASA-TM-105717		N92-29105 * #	SAE PAPER 911981SAE PAPER 911984		A92-45386 A92-45387
NAS 1.15:105675 p	871	N92-29661 * #	NASA-TM-105731 p		N92-29343 * #	SAE PAPER 911985		A92-45388
NAS 1.15:105681	910	N92-29136 * #	NASA-TM-105743p		N92-28674 * #	SAE PAPER 911988		A92-45390 *
NAS 1.15:105698 p	868	N92-28418 * #	NASA-TM-105745 p	828	N92-28696 * #	SAE PAPER 911989		
NAS 1.15:105715 p	868	N92-28419 * #	NASA-TM-107586 p		N92-28435 * #	SAE PAPER 911990		A92-45392
NAS 1.15:105716 p	870	N92-28985 * #	NASA-TM-107635p			SAE PAPER 911991		A92-45393
NAS 1.15:105717 p	909	N92-29105 * #	NASA-TM-4396 p	853	N92-29110 * #	SAE PAPER 911992		A92-45394
NAS 1.15:105731 p	890	N92-29343 * #	NASA-TP-3197 p	827	N92-28477 * #	SAE PAPER 911993 SAE PAPER 911994		A92-45395
NAS 1.15:105743 p : NAS 1.15:105745 p :	828	N92-28674 * # N92-28696 * #	NASA-TP-3224p		N92-28374 * #	SAE PAPER 911995		A92-45396
NAS 1.15:107586 p	850	N92-28435 * #	NASA-TP-3252 p			SAE PAPER 911999		
NAS 1.15:107635 p	831	N92-29445 * #	•			SAE PAPER 912001		
NAS 1.15:4396 p	853	N92-29110 * #	NAVSWC-TR-90-683 p	831	N92-29539 #	SAE PAPER 912003		A92-45404
NAS 1.21:4104 p	929	N92-28344 * #				SAE PAPER 912004		A92-45405
NAS 1.26:186021 p	871	N92-29427 * #	NCEL-TN-1839 p	895	N92-28912 #	SAE PAPER 912005		A92-45406
NAS 1.26:189171 p	924	N92-30207 * #	NLR-MP-88031-Up	827	N92-28658 #	SAE PAPER 912006		
NAS 1.26:189207 p : NAS 1.26:189595 p :	888	N92-29402 * # N92-29352 * #	NLR-MP-88040-U			SAE PAPER 912009		A92-45408 A92-45409
NAS 1.26:189643 p	927	N92-28556 * #	NLR-MP-88044-U p			SAE PAPER 912010		
NAS 1.26:190264	830	N92-29329 * #				SAE PAPER 912014		
NAS 1.26:190400 p	907	N92-28361 * #	NLR-TP-89119-U p			SAE PAPER 912020		
NAS 1.26:190431 p	827	N92-28511 * #	NLR-TP-89126-U p			SAE PAPER 912021		
NAS 1.26:190444 p			NLR-TP-89158-U p NLR-TP-89217-U p			SAE PAPER 912024		
NAS 1.26:190469 p	830	N92-28/18 #	NLR-TP-90062-U		N92-28709 #	SAE PAPER 912025 SAE PAPER 912026		
NAS 1.26:190480 p	879	N92-29654 * #	NLR-TP-90068-U		N92-28649 #	SAE PAPER 912029		
NAS 1.26:190541 p	888	N92-29655 * #	NLR-TP-90097-U p		N92-28711 #	SAE PAPER 912033		
NAS 1.26:190565	854	N92-30209 * #	NLR-TP-90129-U p		N92-28652 #	SAE PAPER 912036		
NAS 1.26:190570 p	832	N92-29657 * #	NLR-TP-90134-U p		N92-28712 #	SAE PAPER 912039		
NAS 1.26:190576 p	832	N92-29691 * #	NLR-TP-90144-U p		N92-28692 #	SAE PAPER 912041		
NAS 1.26:4443 p			NLR-TP-90145-U p NLR-TP-90147-U p		N92-28661 # N92-29204 #	SAE PAPER 912042		
NAS 1.55:10092 p			NLR-TP-90159-U p		N92-28653 #	SAE PAPER 912043 SAE PAPER 912044		
NAS 1.60:3197 p	827	N92-28477 * #	NLR-TP-90163-U p		N92-28654 #	SAE PAPER 912045		
NAS 1.60:3224 p			NLR-TP-90174-U p		N92-28644 #	SAE PAPER 912046		
NAS 1.60:3252p			NLR-TP-90184-U p		N92-28694 #	SAE PAPER 912047		
NAS 1.71:LAR-14219-1 p	879	N92-30025 * #	NLR-TP-90192-U p		N92-28655 #	SAE PAPER 912048		
NAS 1.71:LAR-14612-1 p	911	N92-29954 * #	NLR-TP-90196-U p		N92-29703 #	SAE PAPER 912050		
NAS 1.71:LAR-14698-1 p	911	N92-30028 * #	NLR-TP-90223-U p		N92-28695 #	SAE PAPER 912051		
NAS 1.71:LAR-14775-1 p NAS 1.71:LAR-14815-1-CU p			NLR-TP-90255-U p NLR-TP-90286-U p		N92-28713 # N92-28714 #	SAE PAPER 912052SAE PAPER 912053		
NAS 1.71:LAH-14815-1-CU			NLR-TP-90305-U p		N92-28687 #	SAE PAPER 912053		
p			NLR-TP-90334-U p		N92-28635 #	SAE PAPER 912056		
NASA-CASE-GSC-13346-1 p	909	N92-29099 *	NLR-TP-90336-U p		N92-29603 #	SAE PAPER 912058		
·			NLR-TP-90368-Up		N92-28657 #	SAE PAPER 912059	p 862	A92-45441
NASA-CASE-LAR-14219-1 p			NLR-TP-91061-U p			SAE PAPER 912060		
NASA-CASE-LAR-14281-1 p			NLR-TP-91062-U-PT-1 p	041	N92-29605 #	SAE PAPER 912061		
NASA-CASE-LAR-14612-1 p			NLR-TR-86006-Up	833	N92-29916 #	SAE PAPER 912063 SAE PAPER 912067		A92-45445 A92-45449
NASA-CASE-LAR-14698-1 p NASA-CASE-LAR-14775-1 p			NLR-TR-88072-U			SAE PAPER 912069		
NASA-CASE-LAR-14815-1-CU p						SAE PAPER 912071		
			NTSC-TR-90-09p	907	N92-28253 #	SAE PAPER 912078	p 917	A92-45454
NASA-CASE-MSC-21881-1 p	912	N92-30082 * #	CHERT DOE 100 HOLD THE		1100 nome: "	SAE PAPER 912080		
			ONERA-RSF-136/1865-AY-728-A p			SAE PAPER 912081	p 917	A92-45456
NASA-CASE-NPO-18115-1-CU p	916	N92-29148 *	ONERA-RSF-43/1736-AY-146A p ONERA-RSF-7/3617-AY-022A p			SAE SD 971	n 000	AQ2.48024
NASA-CP-10092 p	831	N92-29625 * #	онен л-пок-7/301/-д1-022д р	. 030	1132-23200 #	SAE SP-871	p 862	M32-40UZ I
NASA-CP-10092 p	912	N92-30106 * #	ONERA, TP NO. 1992-1 p	821	A92-48577	SME PAPER MR91-177	p 897	A92-45260
	–	·	P				,	

SPIE-1367 REPORT NUMBER INDEX

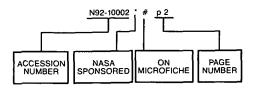
SPIE-1367	p 901	A92-48026 *
TAMRF-5802-92-02	p 832	N92-29657 * #
UDR-TR-91-53	p 895	N92-28398 #
US-PATENT-APPL-SN-560923 US-PATENT-APPL-SN-618790		N92-28729 * N92-29148 *
US-PATENT-APPL-SN-691609	p 909	N92-29099 *
US-PATENT-APPL-SN-760635	p 927	N92-29095 #
US-PATENT-APPL-SN-785637	p 912	N92-30082 * #
US-PATENT-APPL-SN-788908	p 879	N92-30025 * #
US-PATENT-APPL-SN-820431	p 911	N92-29954 * #
US-PATENT-APPL-SN-820432	p 910	N92-29830 * #
US-PATENT-APPL-SN-866769	p 911	N92-30028 * #
US-PATENT-APPL-SN-881912	p 912	N92-30099 * #
US-PATENT-CLASS-244-35R	p 829	N92-28729 *
US-PATENT-CLASS-244-36	p 829	N92-28729 *
US-PATENT-CLASS-310-90.5		N92-29099 *
US-PATENT-CLASS-364-443	p 916	N92-29148 *
US-PATENT-CLASS-374-112	p 916	N92-29148 *
US-PATENT-CLASS-505-876	p 909	N92-29099 *
US-PATENT-CLASS-73-178R	p 916	N92-29148 *
US-PATENT-5,112,120	p 829	N92-28729 *
US-PATENT-5,117,139	p 909	N92-29099 *
US-PATENT-5,117,689	p 916	N92-29148 *
UWA/DME/TR-92/68	p 854	N92-29511 #
WES/TR/EL-92-13	p 926	N92-28302 #
WL-TM-02-307-FIBE	p 887	N92-28772 #
WL-TR-91-2103	p 868	N92-28294 #
WL-TR-91-2111	•	N92-28398 #
WYLE-TN-91-8	p 927	N92-28556 * #

ACCESSION NUMBER INDEX

AERONAUTICAL ENGINEERING / A Continuing Bibliography (Supplement 284)

November 1992

Typical Accession Number Index Listing



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A92-44895	p 783	A92-45303	p 783
A92-44898	р 860	A92-45304 *	p 841
A92-44909	p 916	A92-45305	p 841
A92-44915	p 916	A92-45306	p 860
A92-44919	p 839	A92-45307	p 860
A92-44920	р 839	A92-45308	p 841
A92-44922	p 855	A92-45309	p 783
A92-44923	p 855	A92-45310	p 842
A92-44929	p 855	A92-45311	p 842
A92-44931	p 833	A92-45312	p 842
A92-44932	p 839	A92-45313 *	p 842
A92-44967	p 896	A92-45314	p 881
A92-44969	p 839	A92-45315	p 842
A92-44976	p 879	A92-45316 *	p 860
A92-44981	p 879	A92-45317	p 860
A92-44982	p 916	A92-45318	p 787
A92-44985 *	p 833	A92-45319	p 871
A92-44993	p 834	A92-45320	p 872
A92-44994	p 928	A92-45321	p 860
A92-44995 A92-44996	p 834	A92-45322	p 872
A92-44997	р 834 р 834	A92-45323	p 881
A92-44998	р 834 р 834	A92-45324	p 787
A92-44998 A92-44999	p 834 p 834	A92-45325 *	p 861
A92-44999 A92-45000	p 834 p 834	A92-45373	p 839
A92-45002	p 916	A92-45374	p 855
A92-45025	088 g	A92-45376	p 783
A92-45025	p 880	A92-45380	p 881
A92-45027	p 880	A92-45381	p 842
A92-45028	p 880	A92-45382	p 872
A92-45041	p 834	A92-45383	p 843
A92-45042	p 880	A92-45384	p 872
A92-45044	p 835	A92-45385	p 788
A92-45048	p 835	A92-45386	p 788
A92-45052	p 835	A92-45387	p 843
A92-45054 *	p 835	A92-45388	p 881
A92-45055	p 835	A92-45390 *	p 788
A92-45064	p 916	A92-45391	p 788
A92-45080	p 835	A92-45392	p 788
A92-45081	p 835	A92-45393	p 788
A92-45096	p 880	A92-45394	p 788
A92-45130	p 896	A92-45395	p 789
A92-45202	p 896	A92-45396	p 843
A92-45226	p 896	A92-45397	p 843
A92-45234	p 891	A92-45401	p 789
A92-45236	p 891	A92-45403	p 897
A92-45242	p 897	A92-45404	p 789
A92-45260	p 897	A92-45405	p 789
A92-45261	p 897	A92-45406	p 843
A92-45263 *	p 787	A92-45407 *	p 783
A92-45265 *	p 880	A92-45408 A92-45409	p 789
A92-45266 *	p 880	A92-45409 A92-45410	р 789 р 843
A92-45267	p 881	A92-45410 A92-45412	р 843 р 789
A92-45275	p 881	A92-45412 A92-45413	p 789 p 790
A92-45275 A92-45302	•	A92-45413 A92-45414	p 790 p 790
A92-45302	p 783	N32-43414	p / 90

A92-45416 A92-45417 A92-45418 A92-45419 A92-45421 A92-45424 A92-45426 A92-45426 A92-45427 A92-45428 A92-45430 A92-45431 A92-45431 A92-45436 A92-45436 A92-45437 A92-45436 A92-45437 A92-45438 A92-45438 A92-45441 A92-45441 A92-45441 A92-45456 A92-45469 A92-45489 A92-45489 A92-45499 A92-45499 A92-45499 A92-45490 A92-45590 A92-45	P 897 P 790 P 790 P 784 P 885 P 836 P 836 P 836 P 836 P 836 P 836 P 837 P 791 P 841 P 844 P 844 P 844 P 844 P 844 P 845 P 855 P 891 P 791
A92-45513 # A92-45514 #	p 796 p 796
A92-45516 #	p 797
A92-45518 *#	p 797
A92-45519 # A92-45520 #	p 844 p 797
A92-45522 # A92-45523 #	р 797 р 798
A92-45524 # A92-45525 * #	p 798 p 798
A92-45526 #	p 798
A92-45528 * #	p 798 p 798

p 798

p 799

p 799

A92-45529 #

A92-45530 *#

A92-45531 #

A92-45532 #

A92-45534 * #	p 799	A92-46202	p 784
A92-45535 #	p 799	A92-46227	p 855
A92-45536 #	p 799	A92-46243 A92-46244 *	p 855 p 856
A92-45537 * #	p 800	A92-46246 *	p 856
A92-45538 # A92-45539 * #	р 800 р 800	A92-46247	p 856
A92-45540 * #	p 800	A92-46248 A92-46252	p 925 p 898
A92-45541 * #	p 800	A92-46262 *	p 915
A92-45542 * # A92-45543 * #	р 800 р 801	A92-46264 *	р 809
A92-45544 #	p 801	A92-46426 A92-46427	р 862 р 862
A92-45545 #	p 801	A92-46428	p 889
A92-45546 # A92-45548 #	p 801 p 801	A92-46429	p 862
A92-45549 #	p 801	A92-46430 A92-46431 *	р 925 р 809
A92-45550 * #	p 802	A92-46441	p 809
A92-45551 # A92-45552 * #	p 802 p 802	A92-46449	p 856
A92-45553 * #	p 802	A92-46498 A92-46519	р 898 р 809
A92-45554 #	p 802	A92-46595	p 929
A92-45555 * # A92-45556 #	р 803 р 803	A92-46626	p 809
A92-45557 * #	p 803	A92-46629 A92-46631	p 917
A92-45558 #	p 803	A92-46660	p 892 p 836
A92-45559 # A92-45560 *#	p 803 p 803	A92-46726	p 889
A92-45561 * #	p 803	A92-46736 A92-46737	p 856
A92-45562 #	p 804	A92-46739 *	p 873 p 873
A92-45563 # A92-45564 #	p 804 p 804	A92-46741	p 873
A92-45565 #	p 804	A92-46742 *	p 873
A92-45566 #	p 804	A92-46748 A92-46749	р 917 р 873
A92-45567 # A92-45568 *#	p 805	A92-46750	p 873
A92-45568 * # A92-45569 #	р 805 р 805	A92-46751 *	p 873
A92-45570 #	p 805	A92-46752 A92-46761	p 873 p 873
A92-45571 #	p 805	A92-46762	p 918
A92-45572 # A92-45573 #	р 805 р 845	A92-46765	p 874
A92-45574 *#	p 806	A92-46766 A92-46776	p 889 p 874
A92-45575 * #	p 806	A92-46777	p 874
A92-45576 * # A92-45578 #	р 806 р 806	A92-46778	p 810
A92-45580 #	p 845	A92-46779 A92-46780	p 836 p 882
A92-45581 #	p 928	A92-46781	p 810
A92-45582 # A92-45583 * #	р 806 р 806	A92-46782	p 810
A92-45584 *#	p 806	A92-46783 * A92-46784	p 810 p 836
A92-45585 #	p 807	A92-46785	p 810
A92-45588 # A92-45589 #	p 807 p 917	A92-46786 *	p 810
A92-45590 #	p 807	A92-46787 * A92-46788	р 810 р 915
A92-45592 #	p 807	A92-46790	p 810
A92-45593 # A92-45595 #	р 807 р 807	A92-46791 *	p 810
A92-45596 * #	p 808	A92-46792 A92-46793	р 856 р 811
A92-45597 #	p 808	A92-46794	p 874
A92-45598 * # A92-45600	p 808 p 891	A92-46797	p 811
A92-45606	p 897	A92-46798 * A92-46799 *	p 811 p 925
A92-45629	p 891	A92-46800	p 845
A92-45630 A92-45699	р 891 р 784	A92-46801	p 899
A92-45774	p 898	A92-46802 * A92-46803	p 874 p 915
A92-45826	p 898	A92-46804	p 811
A92-45827 A92-45828	p 808 p 808	A92-46805	p 811
A92-45829	p 808	A92-46806 A92-46807	p 845 p 845
A92-45831 *	p 924	A92-46808	p 811
A92-45833 A92-45835 *	р 898 р 924	A92-46809	p 925
A92-45839	p 808	A92-46810 A92-46811	p 874 p 811
A92-45840 *	p 808	A92-46812	p 845
A92-45845 * A92-45858	р 808 р 809	A92-46813	p 845
A92-45859	p 809	A92-46814	p 811
A92-45876	p 924	A92-46815 A92-46816	p 845 p 811
A92-45879	p 924	A92-46817	p 918
A92-45883 * A92-45885	р 898 р 898	A92-46818	p 812
A92-45921	p 925	A92-46820	p 812
A92-45929	p 925	A92-46825	p 899
A92-46201	p 929	A92-46838	p 892

				100 10000	- 000	A92-48803 # p 903	N92-28294 # p 868
A92-46882 *	p 812	A92-47404	p 848	A92-48268	p 862	A92-48804 # p 825	N92-28302 # p 926
A92-46883	p 812	A92-47405 A92-47406	p 784 p 848	A92-48269	p 893	A92-48805 # p 863	· ·
A92-46884	p 846	A92-47407	p 784	A92-48308	p 840	A92-48817 # p 825	N92-28344 * # p 929
A92-46886	p 812	A92-47408	p 848	A92-48352	p 849	A92-48832 # p 863	N92-28348 # p 786
A92-46887 *	p 812	A92-47410	p 784	A92-48353	р 901	A92-48844 * # p 903	N92-28361 *# p 907
A92-46889	p 812	A92-47412	p 900	A92-48354	p 902	A92-48845 # p 904	N92-28374 *# p 895
A92-46890	p 812	A92-47413	p 784	A92-48408	p 849	A92-48846 # p 893	N92-28376 # p 859
A92-46891	p 812	A92-47414	p 785	A92-48416	p 840	A92-48847 # p 904	N92-28377 # p 859
A92-46892 *	p 812	A92-47416	p 785	A92-48426	p 786	A92-48848 # p 894	N92-28379 # p 859
A92-46894 *	p 812	A92-47417	p 785	A92-48427	p 858	A92-48849 * # p 890	N92-28380 # p 859 N92-28388 # p 883
A92-46895	p 813	A92-47511	p 839	A92-48440	p 920	A92-48855 # p 864	N92-28398 # p 895
A92-46897 *	p 813	A92-47522	p 882	A92-48446 A92-48447	p 902 p 920	A92-48856 # p 864	N92-28407 # p 883
A92-46899 *	p 813	A92-47528	p 900	A92-48448	p 902	A92-48857 # p 825	N92-28418 *# p 868
A92-46900 A92-46901	p 813	A92-47534	p 920	A92-48460	p 902	A92-48858 *# p 864	N92-28419 *# p 868
A92-46901 A92-46902 *	p 813 p 813	A92-47535	p 920	A92-48465	p 902	A92-48859 # p 864	N92-28425 # p 908
A92-46903	p 813	A92-47537	p 920	A92-48470	p 840	A92-48872 # p 904	N92-28426 # p 895
A92-46913	p 813	A92-47538	p 856	A92-48473	p 858	A92-48876 * # p 904 A92-48878 # p 864	N92-28434 * # p 908
A92-46916	p 899	A92-47560	p 857	A92-48475	p 858	A92-48878 # p 864 A92-48879 # p 864	N92-28435 * # p 850
A92-46919	p 846	A92-47562	p 882	A92-48477	p 858	A92-48881 # p 882	N92-28457 * # p 878
A92-46921	p 846	A92-47566	p 839	A92-48480	p 840	A92-48896 # p 904	N92-28458 # p 868
A92-46922	p 846	A92-47567 A92-47574	p 882 p 839	A92-48481	p 863	A92-48897 # p 825	N92-28459 # p 869
A92-46923	p 874	A92-47574 A92-47584	p 882	A92-48485	p 921	A92-48898 # p 825	N92-28460 # p 869
A92-46924 *	p 846	A92-47591	p 848	A92-48487	p 876	A92-48899 # p 825	N92-28461 # p 869
A92-46925	p 846	A92-47592	p 785	A92-48488	p 876	A92-48902 * # p 877	N92-28462 # p 869
A92-46926	p 846	A92-47628	p 928	A92-48489	p 921	A92-48903 # p 923	N92-28463 # p 869
A92-46927	þ 847	A92-47629	p 848	A92-48490	p 876	A92-48904 # p 864	N92-28464 *# p 869
A92-46930	p 847	A92-47630	p 840	A92-48491	p 876	A92-48906 # p 825	N92-28465 # p 869 N92-28466 * # p 870
A92-46931 *	p 874	A92-47631	p 840	A92-48492	p 876	A92-48907 # p 904	
A92-46932 *	p 847	A92-47655	p 785	A92-48493	p 876	A92-48908 * # p 883	
A92-46933	p 875	A92-47656	p 901	A92-48494	p 877	A92-48909 * # p 826	N92-28468 # p 850 N92-28469 # p 851
A92-46934	p 813	A92-47657	p 848	A92-48495	p 877	A92-48910 # p 923	N92-28469 # p 851 N92-28470 # p 851
A92-46935 *	p 813	A92-47660	p 785	A92-48496	p 877 p 877	A92-48911 # p 865	N92-28470 # p 851
A92-46936	p 899	A92-47663	p 901	A92-48499		A92-48915 # p 850	N92-28472 # p851
A92-46940	p 899	A92-47664	p 848	A92-48500	р 926 р 858	A92-48916 # p 850	N92-28472 # p 851
A92-46943	p 847	A92-47666	p 848	A92-48501	p 921	A92-48917 # p 850	N92-28474 # p 851
A92-46944	p 814	A92-47667	p 849	A92-48502		A92-48919 *# p 894	N92-28477 *# p 827
A92-46945 *	p 847	A92-47670	p 785	A92-48506	p 921	A92-48923 * # p 905	N92-28511 *# p 827
A92-46946	p 899	A92-47671	p 901	A92-48513	p 921	A92-48927 # p 894	N92-28522 # p 786
A92-46947	p 814	A92-47684	p 818	A92-48515	p 921	A92-48936 * # p 905	N92-28523 # p 883
A92-46948	p 814	A92-47686	p 818	A92-48518 A92-48520	p 922 p 922	A92-48937 * # p 905	N92-28524 # p 883
A92-46949	p 814	A92-47690	p 819		p 922	A92-48938 # p 905	N92-28525 # p 883
A92-46950	p 814	A92-47691	p 819	A92-48527 A92-48555	p 928	A92-48939 * # p 905	N92-28526 # p 884
A92-46951 *	p 814	A92-47692	p 862	A92-48557	p 922	A92-48940 * # p 865	N92-28527 # p 884
A92-46952 *	p 814	A92-47694	p 819	A92-46557 A92-48565	p 922	A92-48941 # p 850	N92-28528 # p 884
A92-46953 *	p 815	A92-47695	p 819	A92-48567	p 858	A92-48979 # p 865	N92-28530 # p 837
A92-46954 *	p 815	A92-47697	p 862	A92-48569	p 922	A92-48984 * # p 865	N92-28531 # p 852
A92-46955 A92-46956	p 815	A92-47757	p 785	A92-48577	p 821	A92-48986 # p 894	N92-28532 # p 884
A92-46957 *	p 815	A92-47758	p 785	A92-48578	p 893	A92-49014 # p 865	N92-28533 # p 884
A92-46958	p 815 p 815	A92-47759	p 849	A92-48579	p 822	A92-49015 # p 905	N92-28535 # p 884
A92-46959 *		A92-47774	p 786	A92-48585	p 822	A92-49016 # p 906	N92-28536 # p 884
A92-46960	p 816 p 847	A92-47775	p 836	A92-48586	p 849	A92-49018 # p 906	N92-28537 # p 884
A92-46985 * #	p 816	A92-47777	p 875	A92-48587	p 786	A92-49019 # p 865	N92-28539 # p 885
A92-46986 * #	p 816	A92-47779	p 875	A92-48589	p 849	A92-49020 # p 865	N92-28540 # p 885
A92-46996 #	p 899	A92-47782	p 819	A92-48592	p 902	A92-49021 # p 866	N92-28543 # p 885
A92-47028 #	p 925	A92-47783	p 875	A92-48597	p 926	A92-49022 # p 859	N92-28544 # p 885
A92-47035	p 918	A92-47784	p 875	A92-48600	p 882	A92-49023 # p 866 A92-49024 # p 866	N92-28545 * # p 885
A92-47038	p 816	A92-47785	p 875	A92-48601	p 926		N92-28546 # p 886
A92-47041	p 816	A92-47786	p 875	A92-48602	p 926	A92-49025 # p 878 A92-49028 # p 906	N92-28547 # p 886
A92-47042	p 816	A92-47791	p 862	A92-48607	p 902	A92-49031 # p 906	N92-28548 # p 886
A92-47043	p 918	A92-47821	p 786 p 892	A92-48608	ρ 877	A92-49048 # p 906	N92-28549 # p 886
A92-47045 *	p 817	A92-47835 # A92-47839 #		A92-48610	p 893	A92-49049 # p 786	N92-28550 # p 886
A92-47050	p 918	A92-47853 #	p 819 p 901	A92-48618	p 926	A92-49063 * # p 826	N92-28551 * # p 886
A92-47051 *	p 918	A92-47856 #	p 819	A92-48701 #	p 822	A92-49064 # p 906	N92-28552 # p 886
A92-47053	p 918	A92-47858 #	p 820	A92-48702 #	p 822	A92-49076 # p 826	N92-28556 * # p 927
A92-47054	p 817	A92-47860 #	p 820	A92-48703 #	p 822	A92-49085 # p 906	N92-28579 # p 887 N92-28581 # p 923
A92-47055 *	p 919	A92-47872 * #	p 820	A92-48704 #	p 822	A92-49087 # p 907	N92-28581 # p 923 N92-28584 * # p 878
A92-47057	p 817	A92-47873 * #	p 820	A92-48705 #	p 822	A92-49088 # p 826	N92-28635 # p 923
A92-47060	p 817	A92-47875 #	p 820	A92-48712 #	p 889 p 893	A92-49096 # p 907	N92-28644 # p 859
A92-47061	p 817	A92-47876 #	p 820	A92-48713 # A92-48714 #	p 893	A92-49098 # p 866	N92-28649 # p 852
A92-47064	p 817	A92-47892 * #	p 821	A92-48720 #	p 823	A92-49105 # p 894	N92-28652 # p 878
A92-47066	p 919	A92-47894 * #	p 821	A92-48722 #	p 903	A92-49106 # p 894	N92-28653 # p 879
A92-47069	p 919	A92-47913 #	p 901	A92-48723 ° #	p 823	A92-49109 *# p 878	N92-28654 # p 859
A92-47071	p 900	A92-47915 * #	p 821	A92-48724 * #	p 823	A92-49110 *# p 866	N92-28655 # p 837
A92-47078 A92-47079	p 919 p 817	A92-47917 #	p 821	A92-48729 *#	p 823	A92-49111 *# p 866	N92-28657 # p 827
A92-47079 A92-47081	p 919	A92-47925	p 836	A92-48730 *#	p 823	A92-49112 # p 867	N92-28658 # p 827
A92-47083	p 919	A92-47958	p 893	A92-48734 * #	p 903	A92-49113 # p.867	N92-28659 # p 827
A92-47089	p 919	A92-47969	p 849	A92-48735 * #	p 903	A92-49114 # p 867 A92-49115 # p 867	N92-28660 # p 828
A92-47090	p 818	A92-47971	p 786	A92-48737 * #	p 877	A92-49115 # p 867 A92-49117 # p 928	N92-28661 # p 887
A92-47096	p 818	A92-47975	p 849	A92-48738 * #	p 824	A92-49117 # p 926 A92-49118 # p 826	N92-28669 # p 887
A92-47100	p 818	A92-48019	p 821	A92-48739 #	p 849	A92-49119 # p 867	N92-28673 * # p 887
A92-47122	p 847	A92-48021	p 862 p 849	A92-48740 #	p 824	A92-49119 # p.867	N92-28674 * # p 828
A92-47128 *	p 900	A92-48022		A92-48741 * #	p 824	A92-49126 *# p 907	N92-28686 # p 870
A92-47153	p 818	A92-48026 *	p 901 p 857	A92-48742 #	p 824	A92-49128 *# p 867	N92-28687 # p 852
A92-47155	p 818	A92-48041 A92-48042	p 857 p 857	A92-48743 * #	p 863	A92-49134 *# p 894	N92-28689 # p 915
A92-47176	p 900	A92-48042 A92-48043	p 857	A92-48744 * #	p 824	A92-49136 # p 895	N92-28692 # p 828
A92-47188	p 900	A92-48043 A92-48044	p 857	A92-48780 * #	p 890	A92-49139 # p 868	N92-28694 # p 908
A92-47267	p 900	A92-48044 A92-48046	p 857	A92-48790 #	p 863	A92-49188 p 827	N92-28695 # p 927
A92-47303	p 882	A92-48047	p 857	A92-48792 #	p 903		N92-28696 *# p 828
A92-47338	p 892		•	A92-48793 #	p 836	N92-28245 # p 923	N92-28709 # p 828
A92-47340	p 892	A92-48160 *	p 876	A92-48794 #	p 922		N92-28711 # p870
A92-47341	p ose	400 4000					
M32-41341	p 892	A92-48201	p 901	A92-48800 #	p 824	· · · · · ·	N92-28712 # p 908
A92-47365		A92-48207	p 821	A92-48801 #	p 863	N92-28253 # p 907	N92-28713 # p 829
	p 892		•			· · · · · ·	

N92-28718 *# p 840 N92-29954 * # p 911 N92-29997 # N92-30025 * # N92-28720 * # N92-28721 * # p 928 p 879 p 852 p 852 N92-30028 * # N92-30042 * # N92-30044 * # N92-30064 * # p 911 p 912 N92-28729 * p 829 N92-28771 # p 853 p 887 N92-28772 p 912 N92-28788 p 908 p 912 p 912 p 829 p 879 N92-30065 * # N92-28789 N92-30076 # N92-30082 * # N92-28801 p 889 p 912 p 912 N92-28802 p 853 N92-30099 * # N92-30106 * # N92-30107 * # N92-28814 p 909 N92-28820 p 829 p 912 p 913 p 837 N92-28829 p 887 N92-30108 * # N92-30109 * # N92-30110 * # N92-28833 p 888 N92-28835 p 888 p 913 p 909 p 913 p 913 N92-28836 N92-30111 * # N92-30112 * # N92-30113 * # p 829 N92-28865 р 913 р 914 р 914 N92-28879 p 909 N92-28883 # N92-28888 # N92-28900 # N92-28901 # N92-28910 * N92-28910 * N92-28910 * p 829 p 830 N92-30114 * # N92-30115 * # N92-30116 * # p 837 p 914 p 914 p 914 p 853 N92-30117 *# N92-30118 *# N92-30119 *# p 927 p 853 p 914 N92-28910 # N92-28912 # N92-28921 # N92-28923 # N92-28980 * N92-28980 * N92-26985 * N92-26985 # p 914 p 895 p 895 N92-30120 *# N92-30121 *# p 915 p 915 p 787 p 927 N92-30122 * # p 853 p 830 N92-30123 * # N92-30124 * # N92-30128 * # p 838 p 870 p 838 p 838 p 838 p 927 N92-29095 # N92-30128 *#
N92-30129 *#
N92-30130 *#
N92-30131 *#
N92-30133 *#
N92-30182 *# N92-29099 p 909 N92-29099 * N92-29103 * # N92-29104 * # N92-29110 * # N92-29118 # N92-29136 * * * N92-29136 * * * N92-29136 * * N92-2916 * N92-2916 * * N92-2916 * * N92-2916 * N92 p 841 p 890 p 909 p 838 p 838 p 915 p 853 p 838 p 909 p 910 p 833 N92-30207 * # N92-30209 * # N92-30232 # p 924 p 916 p 830 N92-29148 * p 854 p 787 N92-29159 # N92-29180 # N92-29182 # p 854 N92-29182 N92-29188 p 837 N92-29188 # N92-29191 # N92-29201 # p 923 p 910 p 927 p 888 p 830 N92-29204 N92-29206 p 929 p 859 p 830 N92-29218 N92-29222 # N92-29329 * # N92-29343 * # N92-29344 # p 890 p 910 p 888 N92-29352 * # N92-29352 * # N92-29361 * # N92-29402 * # N92-29408 # N92-29417 * # N92-29425 * # p 830 p 831 p 896 p 854 p 871 p 871 N92-29425 # N92-29427 * # N92-29505 # N92-29505 # N92-29511 # N92-29539 # p 831 p 888 p 854 p 831 p 896 p 910 N92-29580 N92-29603 N92-29604 p 924 N92-29605 p 841 p 841 N92-29615 N92-29616 p 854 p 831 p 890 N92-29625 N92-29629 # N92-29648 # N92-29649 # N92-29650 # N92-29654 *# p 831 p 831 p 854 N92-29654 *#
N92-29655 *#
N92-29657 *#
N92-29659 *#
N92-29661 *#
N92-29683 #
N92-29703 #
N92-29703 #
N92-29713 #
N92-29714 #
N92-29830 *#
N92-29830 *#
N92-29837 #
N92-29874 #
N92-29877 #
N92-29877 # p 879 p 888 p 832 p 871 p 871 p 890 p 910 p 832 p 837 p 888 p 832 p 832 p 910 p 859 p 910 p 787 p 911 p 832 N92-29877 N92-29884 N92-29889 p 833 N92-29916 # p 833 N92-29927 # p 871 N92-29933 # p 911

N92-30232

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A92-10000 Series)

Publications announced in *IAA* are available from the AIAA Technical Information Service as follows: Paper copies of accessions are available at \$10.00 per document (up to 50 pages), additional pages \$0.25 each. Standing order microfiche are available at the rate of \$1.45 per microfiche for *IAA* source documents and \$1.75 per microfiche for AIAA meeting papers.

Minimum air-mail postage to foreign countries is \$2.50. All foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to: Technical Information Service, American Institute of Aeronautics and Astronautics, 555 West 57th Street, New York, NY 10019. Please refer to the accession number when requesting publications.

STAR ENTRIES (N92-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below, and their addresses are listed on page APP-4. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

- Avail: CASI. Sold by the NASA Center for AeroSpace Information. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the STAR citation. Current values for the price codes are given in the tables on page APP-5.
 - NOTE ON ORDERING DOCUMENTS: When ordering publications from CASI, use the N accession number or other report number. It is also advisable to cite the title and other bibliographic identification.
- Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy.
- Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, address inquiry to the BLL.)
- Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.
- Avail: ESDU. Pricing information on specific data, computer programs, and details on Engineering Sciences Data Unit (ESDU) topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page APP-4.
- Avail: Fachinformationszentrum, Karlsruhe. Gesellschaft für wissenschaftlich-technische Information mbH 7514 Eggenstein-Leopoldshafen 2, Germany.
- Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, CA. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

- Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.
- Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration (JBD-4), Public Documents Room (Room 1H23), Washington, DC 20546-0001, or public document rooms located at NASA installations, and the NASA Pasadena Office at the Jet Propulsion Laboratory.
- Avail: NTIS. Sold by the National Technical Information Service. Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) are available. For information concerning this service, consult the NTIS Subscription Section, Springfield, VA 22161.
- Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.
- Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of \$1.50 each, postage free. (See discussion of NASA patents and patent applications below.)
- Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.
- Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed on page APP-4. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 53 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 53 regional depositories. A list of the regional GPO libraries, arranged alphabetically by state, appears on the inside back cover. These libraries are *not* sales outlets. A local library can contact a Regional Depository to help locate specific reports, or direct contact may be made by an individual.

PUBLIC COLLECTION OF NASA DOCUMENTS

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA — Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 CEDEX 15, France.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7037 supplements and annual index are available from the NASA Center for AeroSpace Information (CASI) on standing order subscription. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics Technical Information Service 555 West 57th Street, 12th Floor New York, New York 10019

British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England

Commissioner of Patents and Trademarks U.S. Patent and Trademark Office Washington, DC 20231

Department of Energy Technical Information Center P.O. Box 62 Oak Ridge, Tennessee 37830

European Space Agency-Information Retrieval Service ESRIN Via Galileo Galilei 00044 Frascati (Rome) Italy

Engineering Sciences Data Unit International P.O. Box 1633 Manassas, Virginia 22110

Engineering Sciences Data Unit International, Ltd. 251-259 Regent Street London, W1R 7AD, England

Fachinformationszentrum Karlsruhe Gesellschaft für wissenschaftlich-technische Information mbH 7514 Eggenstein-Leopoldshafen 2, Germany

Her Majesty's Stationery Office P.O. Box 569, S.E. 1 London, England

NASA Center for AeroSpace Information P.O. Box 8757 Baltimore, Maryland 21240-0757 National Aeronautics and Space Administration Scientific and Technical Information Program (JTT) Washington, DC 20546-0001

National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

Pendragon House, Inc. 899 Broadway Avenue Redwood City, California 94063

Superintendent of Documents U.S. Government Printing Office Washington, DC 20402

University Microfilms A Xerox Company 300 North Zeeb Road Ann Arbor, Michigan 48106

University Microfilms, Ltd. Tylers Green London, England

U.S. Geological Survey Library National Center MS 95012201 Sunrise Valley Drive Reston, Virginia 22092

U.S. Geological Survey Library 2255 North Gemini Drive Flagstaff, Arizona 86001

U.S. Geological Survey 345 Middlefield Road Menlo Park, California 94025

U.S. Geological Survey Library Box 25046 Denver Federal Center, MS914 Denver, Colorado 80225

CASI PRICE TABLES

(Effective October 1, 1992)

STANDARD PRICE DOCUMENTS

PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	\$ 9.00	\$ 18.00
A02	12.50	25.00
A03	17.00	34.00
A04-A05	19.00	38.00
A06-A09	26.00	52.00
A10-A13	35.00	70.00
A14-A17	43.00	86.00
A18-A21	50.00	100.00
A22-A25	59.00	118.00
A99	69.00	138.00

MICROFICHE

PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	\$ 9.00	\$ 18.00
A02	12.50	25.00
A03	17.00	34.00
A04	19.00	38.00
A06	26.00	52.00
A10	35.00	70.00

IMPORTANT NOTICE

CASI Shipping and Handling Charges
U.S. — ADD \$3.00 per TOTAL ORDER
Canada and Mexico — ADD \$3.50 per TOTAL ORDER
All Other Countries — ADD \$7.50 per TOTAL ORDER
Does NOT apply to orders
requesting CASI RUSH HANDLING.
Contact CASI for charge.

4. Trite and Subtilia Aeronautical Engineering A Continuing Bibliography (Supplement 284) 5. Report Date November 1992 6. Performing Organization Code JTT 7. Author(s) 8. Performing Organization Report No. 10. Work Unit No. 11. Contract or Grant No. 12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 15. Supplementary Notes 16. Abstract This bibliography (lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited	1. Report No. NASA SP-7037(284)	Government Accessi	on No.	3. Recipient's Catalog	No.
A Continuing Bibliography (Supplement 284) 6. Performing Organization Code JTT 7. Author(s) 8. Performing Organization Report No. 9. Performing Organization Name and Address NASA Scientific and Technical Information Program 10. Work Unit No. 11. Contract or Grant No. 12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 13. Type of Report and Period Covered Special Publication 14. Sponsoring Agency Code 15. Supplementary Notes 16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited	Title and Subtitle Aeronautical Engineering				
9. Performing Organization Name and Address NASA Scientific and Technical Information Program 11. Contract or Grant No. 12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 15. Supplementary Notes 16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited				ation Code	
9. Performing Organization Name and Address NASA Scientific and Technical Information Program 11. Contract or Grant No. 12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 15. Supplementary Notes 16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited	7. Author(s)			8. Performing Organiza	ation Report No.
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 14. Sponsoring Agency Code 15. Supplementary Notes 16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited		tion Program		10. Work Unit No.	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546 14. Sponsoring Agency Code 15. Supplementary Notes 16. Abstract This bibliography tists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited	NASA Scientific and recrifical informati	NASA Scientific and Technical Information Program			No.
Washington, DC 20546 15. Supplementary Notes 16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited		iniatration		4	
16. Abstract This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited		Inistration		14. Sponsoring Agency	y Code
This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited	15. Supplementary Notes	· · · · · · · · · · · · · · · · · · ·	<u> </u>		
This bibliography lists 974 reports, articles and other documents introduced into the NASA scientific and technical information system in October 1992. 17. Key Words (Suggested by Author(s)) Aeronautical Engineering 18. Distribution Statement Unclassified - Unlimited					
	This bibliography lists 974 reports, an information system in October 1992.	ticles and other docu		the NASA scientific	and technical
Bibliographies	Aeronautical Engineering Aeronautics		Unclassified - Unlin Subject Category -		
19. Security Classif. (of this report) Unclassified 20. Security Classif. (of this page) Unclassified 21. No. of Pages 22. Price * A12/HC		_ ·	this page)		

FEDERAL REGIONAL DEPOSITORY LIBRARIES

ALABAMA AUBURN UNIV. AT MONTGOMERY LIBRARY

Documents Dept. 7300 University Drive Montgomery, AL 36117-3596 (205) 244-3650 FAX: (205) 244-0678

UNIV. OF ALABAMA Amelia Gayle Gorgas Library Govt. Documents Box 870266 Tuscaloosa, AL 35487-0266 (205) 348-6046 FAX: (205) 348-8833

DEPT. OF LIBRARY, ARCHIVES,

AND PUBLIC RECORDS Federal Documents Third Floor State Capitol 1700 West Washington

Phoenix, AZ 85007 (602) 542-4121 FAX: (602) 542-4400; 542-4500

ARKANSAS

ARKANSAS STATE LIBRARY

State Library Services One Capitol Mall Little Rock, AR 72201 (501) 682-2869

CALIFORNIA

CALIFORNIA STATE LIBRARY

Govt. Publications Section 914 Capitol Mall - P.O. Box 942837 Sacramento, CA 94237-0001 (916) 322-4572 FAX: (916) 324-8120

COLORADO UNIV. OF COLORADO - BOULDER Norlin Library

Govt. Publications Campus Box 184 Boulder, CO 80309-0184 (303) 492-8834 FAX: (303) 492-2185

DENVER PUBLIC LIBRARY

Govt. Publications Dept. BS/GPD 1357 Broadway
Denver, CO 80203 (303) 571-2135

CONNECTICUT

CONNECTICUT STATE LIBRARY 231 Capitol Avenue

Hartford, CT 06106

(203) 566-4971 FAX: (203) 566-3322

FLORIDA UNIV. OF FLORIDA LIBRARIES

Documents Dept. Library West Gainesville, FL 32611-2048 (904) 392-0366 FAX: (904) 392-7251

GEORGIA UNIV. OF GEORGIA LIBRARIES

Govt. Documents Dept. Jackson Street Athens, GA 30602 (404) 542-8949 FAX: (404) 542-6522

HAWAII

UNIV. OF HAWAII Hamilton Library

Govt. Documents Collection 2550 The Mall Honolulu, HI 96822 (808) 948-8230 FAX: (808) 956-5968

IDAHO UNIV. OF IDAHO LIBRARY

Documents Section

Moscow, ID 83843 (208) 885-6344 FAX: (208) 885-6817

ILLINOIS ILLINOIS STATE LIBRARY

Reference Dept.

300 South Second Springfield, IL 62701-1796 (217) 782-7596 FAX: (217) 524-0041

INDIANA INDIANA STATE LIBRARY

Serials/Documents Section 140 North Senate Avenue Indianapolis, IN 46204 (317) 232-3678 FAX: (317) 232-3728

UNIV. OF IOWA LIBRARIES

Govt. Publications Dept. Washington & Madison Streets lowa City, IA 52242 (319) 335-5926 FAX: (319) 335-5830

KANSAS

UNIV. OF KANSAS

Govt. Documents & Map Library 6001 Malatt Hall Lawrence, KS 66045-2800 (913) 864-4660 FAX: (913) 864-5380

KENTUCKY

UNIV. OF KENTUCKY LIBRARIES

Govt. Publications/Maps Dept. Lexington, KY 40506-0039 (606) 257-3139 FAX: (606) 257-1563; 257-8379

LOUISIANA

LOUISIANA STATE UNIV.

Middleton Library Govt. Documents Dept. Baton Rouge, LA 70803 (504) 388-2570 FAX: (504) 388-6992

LOUISIANA TECHNICAL UNIV.

Prescott Memorial Library Govt. Documents Dept. 305 Wisteria Street Ruston, LA 71270-9985 (318) 257-4962 FAX: (318) 257-2447

TRI-STATE DOCUMENTS DEPOSITORY

Raymond H. Fogler Library Govt. Documents & Microforms Dept. Univ. of Maine Orono, ME 04469 (207) 581-1680

MARYLAND

UNIV. OF MARYLAND

Hornbake Library Govt. Documents/Maps Unit College Park, MD 20742 (301) 454-3034 FAX: (301) 454-4985

MASSACHUSETTS BOSTON PUBLIC LIBRARY

Govt. Documents Dept. 666 Boylston Street Boston, MA 02117 (617) 536-5400 ext. 226 FAX: (617) 267-8273; 267-8248

MICHIGAN DETROIT PUBLIC LIBRARY

5201 Woodward Avenue Detroit, MI 48202-4093 (313) 833-1440; 833-1409 FAX: (313) 833-5039

LIBRARY OF MICHIGAN

Govt. Documents Unit P.O. Box 30007 Lansing, MI 48909 (517) 373-0640 FAX: (517) 373-3381

MINNESOTA UNIV. OF MINNESOTA

Wilson Library Govt. Publications Library 309 19th Avenue South Minneapolis, MN 55455 (612) 624-5073 FAX: (612) 626-9353

MISSISSIPPI UNIV. OF MISSISSIPPI

J.D. Williams Library Federal Documents Dept. 106 Old Gym Bldg. University, MS 38677 (601) 232-5857 FAX: (601) 232-5453

MISSOURI

UNIV. OF MISSOURI - COLUMBIA

Ellis Library Govt. Documents Columbia, MO 65201 (314) 882-6733 FAX: (314) 882-8044

MONTANA

UNIV. OF MONTANA

Maureen & Mike Mansfield Library Documents Div. Missoula, MT 59812-1195 (406) 243-6700 FAX: (406) 243-2060

NEBRASKA

UNIV. OF NEBRASKA - LINCOLN D.L. Love Memorial Library Documents Dept. Lincoln, NE 68588 (402) 472-2562

NEVADA

UNIV. OF NEVADA

Reno Library
Govt. Publications Dept. Reno, NV 89557 (702) 784-6579 FAX: (702) 784-1751

NEW JERSEY NEWARK PUBLIC LIBRARY

U.S. Documents Div. 5 Washington Street -P.O. Box 630 Newark, NJ 07101-0630 (201) 733-7812 FAX: (201) 733-5648

NEW MEXICO UNIV. OF NEW MEXICO

General Library Govt. Publications Dept. Albuquerque, NM 87131-1466 (505) 277-5441 FAX: (505) 277-6019

NEW MEXICO STATE LIBRARY

325 Don Gaspar Avenue Santa Fe, NM 87503 (505) 827-3826 FAX: (505) 827-3820

NEW YORK

NEW YORK STATE LIBRARY

Documents/Gift & Exchange Section Federal Depository Program Cultural Education Center Albany, NY 12230 (518) 474-5563 FAX: (518) 474-5786

NORTH CAROLINA UNIV. OF NORTH CAROLINA -CHAPEL HILL

CB#3912, Davis Library BA/SS Dept. — Documents Chapel Hill, NC 27599 (919) 962-1151 FAX: (919) 962-0484

NORTH DAKOTA NORTH DAKOTA STATE UNIV. LIBRARY

Documents Office Fargo, ND 58105 (701) 237-8886 FAX: (701) 237-7138 In cooperation with Univ. of North Dakota, Chester Fritz Library Grand Forks

ОНЮ STATE LIBRARY OF OHIO

Documents Dept. 65 South Front Street Columbus, OH 43266 (614) 644-7051 FAX: (614) 752-9178

OKLAHOMA OKLAHOMA DEPT. OF LIBRARIES

U.S. Govt. Information Div. 200 NE 18th Street Oklahoma City, OK 73105-3298 (405) 521-2502, ext. 252, 253 FAX: (405) 525-7804

OKLAHOMA STATE UNIV.

Edmon Low Library Documents Dept. Stillwater, OK 74078 (405) 744-6546 FAX: (405) 744-5183

OREGON PORTLAND STATE UNIV.

Millar Library 934 SW Harrison - P.O. Box 1151 Portland, OR 97207 (503) 725-3673 FAX: (503) 725-4527

PENNSYLVANIA STATE LIBRARY OF PENN.

Govt. Publications Section Walnut St. & Commonwealth Ave. -P.O. Box 1601 Harrisburg, PA 17105 (717) 787-3752

SOUTH CAROLINA

CLEMSON UNIV.

Cooper Library Public Documents Unit Clemson, SC 29634-3001 (803) 656-5174 FAX: (803) 656-3025 In cooperation with Univ. of South Carolina, Thomas Cooper Library, Columbia

TENNESSEE

MEMPHIS STATE UNIV. LIBRARIES

Govt. Documents Memphis, TN 38152 (901) 678-2586 FAX: (901) 678-2511

TEXAS STATE LIBRARY

United States Documents P.O. Box 12927 - 1201 Brazos Austin, TX 78711 (512) 463-5455 FAX: (512) 463-5436

TEXAS TECH. UNIV. LIBRARY

Documents Dept. Lubbock, TX 79409 (806) 742-2268 FAX: (806) 742-1920

UTAH

UTAH STATE UNIV.

Merrill Library & Learning Resources Center, UMC-3000 Documents Dept. Logan, UT 84322-3000 (801) 750-2684 FAX: (801) 750-2677

VIRGINIA

UNIV. OF VIRGINIA

Alderman Library Govt. Documents Charlottesville, VA 22903-2498 (804) 924-3133 FAX: (804) 924-4337

WASHINGTON WASHINGTON STATE LIBRARY

Document Section MS AJ-11 Olympia, WA 98504-0111 (206) 753-4027 FAX: (206) 753-3546

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY

Govt. Documents Section P.O. Box 6069 Morgantown, WV 26506 (304) 293-3640

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY

Govt. Publications Section 816 State Street Madison, WI 53706 (608) 262-2781 FAX: (608) 262-4711 In cooperation with Univ. of Wisconsin-Madison, Memorial Library

MILWAUKEE PUBLIC LIBRARY

Documents Div. 814 West Wisconsin Avenue Milwaukee, WI 53233 (414) 278-2167 FAX: (414) 278-2137 National Aeronautics and **Space Administration** Code JTT Washington, D.C. 20546-0001

Official Business Penalty for Private Use, \$300 National Aeronautics and Space Administration Code JTT Washington DC 20546 Official Business Penalty for Private Use, \$300

ACCESSIONING

BALTIMORE MD 21240

FOURTH CLASS L1 001 SP7037-284921223S090569A CENTER FOR AEROSPACE INFORMATION P O BOX 8757 BWI ARPRT

POSTMASTER:

If Undeliverable (Section 158 Postal Manual) Do Not Return